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DAVIS, EDWARD P., M.D.

EWART, WILLIAM, M.D., F.R.C.P.

GOTTHEIL, WILLIAM S., M.D.

SPILLER, WILLIAM G., M.D.

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PROGRESSIVE MEDICINE

A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES
AND IMPROVEMENTS

IN THE

MEDICAL AND SURGICAL SCIENCES

EDITED BY

HOBART AMORY HARE, M.D.

PROFESSOR OF THERAPEUTICS AND MATERIA MEDICA IN THE JEFFERSON MEDICAL COLLEGE OF PHILADELPHIA; PHYSICIAN TO THE JEFFERSON MEDICAL COLLEGE HOSPITAL; ONE TIME CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE UNIVERSITY OF PENNSYLVANIA;
MEMBER OF THE ASSOCIATION OF AMERICAN PHYSICIANS, ETC.

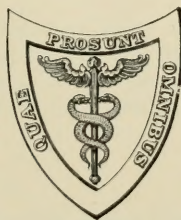
ASSISTED BY

LEIGHTON F. APPLEMAN, M.D.

INSTRUCTOR IN THERAPEUTICS, JEFFERSON MEDICAL COLLEGE, PHILADELPHIA; OPHTHALMOLOGIST TO THE FREDERICK DOUGLASS MEMORIAL HOSPITAL; INSTRUCTOR IN OPHTHALMOLOGY, PHILADELPHIA POLYCLINIC HOSPITAL AND COLLEGE FOR GRADUATES IN MEDICINE.

VOLUME III. SEPTEMBER, 1911

DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART, LUNGS,
AND BLOODVESSELS—DERMATOLOGY AND SYPHILIS—OBSTETRICS—
DISEASES OF THE NERVOUS SYSTEM.



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LIST OF CONTRIBUTORS

JOSEPH C. BLOODGOOD, M.D.,

Associate Professor of Surgery, Johns Hopkins University, Baltimore, Md.

C. W. BONNEY, M.D.,

Assistant Demonstrator of Anatomy at the Jefferson Medical College, Philadelphia.

JOHN ROSE BRADFORD, M.D., F.R.C.P., F.R.S.,

Professor of Medicine in University College and Physician to the University College Hospital, London.

JOHN G. CLARK, M.D.,

Professor of Gynecology in the University of Pennsylvania, Philadelphia.

WILLIAM B. COLEY, M.D.,

Professor of Clinical Surgery, Cornell University Medical School; Attending Surgeon to the General Memorial Hospital; Attending Surgeon to the Hospital for Ruptured and Crippled.

FLOYD M. CRANDALL, M.D.,

Consulting Physician to the Infants' and Children's Hospital; Late Visiting Physician to Minturn Hospital, New York.

EDWARD P. DAVIS, M.D.,

Professor of Obstetrics in the Jefferson Medical College of Philadelphia.

ARTHUR B. DUEL, M.D.,

Professor of Otology, New York Polyclinic Medical School and Hospital; Aural Surgeon to the Manhattan Eye, Ear, and Throat Hospital, and to the Polyclinic Hospital; Otologist to the Babies' Hospital; Consulting Aural Surgeon to the Skin and Cancer Hospital, and to the New York Health Board Hospitals.

WILLIAM EWART, M.D., F.R.C.P.,

Consulting Physician to St George's Hospital and to the Belgrave Hospital for Children, London.

CHARLES H. FRAZIER, M.D.,

Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the University, Howard, and Philadelphia Hospitals.

ARPAD G. GERSTER, M.D.,

Professor of Surgery in the New York Polyclinic, and Surgeon to the German and Mount Sinai Hospitals, New York.

WILLIAM S. GOTTHEIL, M.D.,

Adjunct Professor of Dermatology, New York Post-Graduate Medical School; Consulting Dermatologist to Beth Israel and Washington Heights Hospitals; Visiting Dermatologist to the City and Lebanon Hospitals, New York City.

EDWARD JACKSON, M.D.,

Professor of Ophthalmology in the University of Colorado; Ophthalmologist to the City and County Hospital of Denver.

D. BRADEN KYLE, M.D.,

Professor of Laryngology in the Jefferson Medical College, Philadelphia.

H. R. M. LANDIS, M.D.,

Director of the Clinical Department of the Phipps Institute of the University of Pennsylvania; Associate in Medicine, University of Pennsylvania; Visiting Physician to the White Haven Sanatorium.

R. S. LAVENSON, M.D.,

Instructor in Medicine in the University of Pennsylvania.

JOHN RUHRÄH, M.D.,

Professor of Diseases of Children and Therapeutics, College of Physicians and Surgeons; Visiting Physician, Robert Garrett Hospital, Nursery and Child's Hospital, Mercy Hospital; Consulting Physician, Church Home and Infirmary, Baltimore.

WILLIAM G. SPILLER, M.D.,

Professor of Neuropathology and Associate Professor of Neurology in the University of Pennsylvania; Clinical Professor of Nervous Diseases in the Woman's Medical College of Pennsylvania.

ALFRED STENGEL, M.D.,

Professor of the Theory and Practice of Medicine and Clinical Medicine in the University of Pennsylvania, Philadelphia.

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PROGRESSIVE MEDICINE

SEPTEMBER, 1911

DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART, LUNGS, AND BLOODVESSELS

BY WILLIAM EWART, M.D., F.R.C.P.

THE SANATORIUM, THE DISPENSARY, THE TUBERCULIN DISPENSARY, AND THE TUBERCULIN TREATMENT

THE whole question of the treatment of tuberculosis, curative, palliative, and preventive, and of its public aspects, has been brought to a head by Camac Wilkinson's persistent advocacy of "progressive doses of tuberculin," and of their systematic use at the Tuberculin Dispensary. This new departure in the practical plan of campaign has raised much criticism¹ and reopened the main therapeutic question of tuberculin, as well as the main economical questions of the relative value of the sanatorium and of the antituberculosis dispensary, of the "in-patient treatment" and "out-patient treatment," of the "sedentary" or "ambulatory," and of the "unemployed and assisted," or "wage-earning and self-supporting" treatment. The disposal and the segregation of the advanced cases constitute a distinct problem.

The "institutional" question was the central position in the three-cornered fight between the sanatorium representatives, those of the antituberculosis dispensary, headed by R. W. Philip, and those of the tuberculin dispensary, by Wilkinson, whose well-known attitude toward the sanatorium is one of "qualified approval."

The attack was led from the sanatorium side by A. M. N. Pringle's manifesto, containing answers to a "referendum" submitted to superintendents of sanatoriums in England and Wales. The replies agreed that tuberculin is useful for the early not markedly febrile cases, and

¹ British Medical Journal, February-March, 1911.

contraindicated in mixed infections. But the unanimous verdict was that it could "not be safely and properly administered at a tuberculin dispensary," where the patients attend for injection once or twice a week. An emphatic negative was also given to the question as to whether the establishment of tuberculin dispensaries could replace sanatoriums, where patients are under constant skilled supervision and control.

Thus, the active controversy as to tuberculin has suddenly shifted from the safety, the efficacy, and the desirability of its employment, to the administrative question how best to employ it. Foothold has been gained in our own medical world for the doctrine so patiently evolved and taught elsewhere, and particularly in Germany. For instance, E. Mariette resents any suggestion that Wilkinson's dispensary is the only place where tuberculin is being used in large doses, which, until recently, had been thought "heroic." He refers to a private sanatorium, where nearly all the patients are being treated with tuberculin in progressive doses, gradually working up to large immunizing doses; his results have been "surprisingly good." Several authorities, who had held back, now accept the main situation. This recognition is partly owing to the new institution. But it had previously been worked up to by various clinical workers, and by eminent writers, including Bandelier and Roepke (*Lehrbuch der Specificischen Diagnostik und Therapie der Tuberculose*) and others.

Koch himself fully agreed with the principle of progressive dosage, and recent experimental research has been carried forward vigorously in Germany rather in the direction of practical clinical results, than along the theoretical lines of the opsonic index, and more recently of the theory of fixation of complement.

What is a Tuberculin Dispensary? According to Wilkinson, it is primarily a dispensary for the earlier diagnosis and for the simplest and most effectual treatment of tubercle "by tuberculin." But it is also a dispensary for the examination, and, if necessary, the treatment of "contacts," and its work must therefore extend to the homes of the consumptives.

What is a Tuberculosis Dispensary? As stated by R. W. Philip, it is already a "world movement." According to Halliday Sutherland, "it aims at more than treatment by tuberculin, which is not applicable to all cases, or even to all early cases. It is the base in aggressive warfare against the sources of the disease; a central bureau for the collection and dissemination of all information relating to tuberculosis; an agency for our visiting physicians and nurses to cope with the dangers arising from the 'advanced, undiagnosed, and ignorant consumptive.' The 'educated' consumptive is a danger to no one. It is also the centre from which suitable cases are drafted to sanatoriums, to special hospitals, to public health authorities, and to various charitable agencies. It claims to be a scientific as well as a

philanthropic institution." This surely implies that it is ready to adopt any available advance that may have been made in our curative methods.

It is clear that both dispensaries possess identical aims; and that their convergence, their coöperation, and their ultimate fusion are a matter of time. The difference which has arisen is largely due to a terminological confusion. But it is due also to the novelty of a technique, the merits of which can only be ascertained by personal trial. R. W. Philip freely declares that "vaccine therapy and aërotherapy are not mutually exclusive." And Wilkinson also disclaims the thought for any such antagonism, although he has been taken to task for insisting upon the great cost and the limitation of sanatorium accommodation, and upon the relative inadequacy of sanatorium treatment.

In 1902, Wilkinson¹ published his personal experience of nearly 70 cases, having always observed improvement provided there was no mixed infection. Five years later he maintained that tuberculin was invaluable as a help in the selection of suitable cases for sanatoriums, and as a gauge of the success or failure of treatment; while it was quite harmless to those free from tuberculosis. But he could not express a confident opinion as to the value of tuberculin as a curative agent.

Last year, in two fresh communications,² he dwelt upon the extraordinary effects of "large doses" in laryngeal tuberculosis. In 1908, his book, entitled *Treatment of Consumption*, described the method, and its results; and stated that an occasional reaction with fever did no harm, and often did great good, especially in the early stages of the disease and of the treatment, but that the dose and the rapidity of any increase cannot be a matter of routine; each case must be treated on its own merits.

"Beginning with about 0.001 gram and rising gradually to as much as 1 gram; if no reaction occurred after the first dose, he generally gave another and larger dose in three or four days. When reactions occurred, the interval was increased according to the degree of fever. The full treatment might last four, six, or eight months, or longer, but it could be carried out without interfering seriously with a man's business."

More recently, Wilkinson opened his Tuberculin Dispensary in Kennington Road, London, S. E. And subsequently others have been opened (at Aldershot, Street, Irvine, Aberdeen, Leith, Oxford, Portsmouth, Poplar, Banbury, etc.) by the "Tuberculin Dispensary League" under his chairmanship. Finally, in February, 1911, the Portsmouth Council, guided by the evidence of Dr. Mearns Fraser, Public Officer of Health, and of the Mayor, adopted Wilkinson's scheme, in preference to the sanatorium system, with only one dissident.

¹ British Medical Journal, vol. i, 1907.

² Ibid., 1910, vol. i.

The system adopted by Wilkinson¹ is not based upon ordinary administration of Koch's old and new tuberculin, but upon the principle of gradually increasing the active immunizing power of the body by a course of some of the less toxic tuberculins. "If he were dependent only on old and new tuberculin he would never advocate tuberculin dispensaries, as the attempt would probably result in a recurrence of the disasters which followed its introduction by Koch in 1891 and 1892." New tuberculin is not given at Wilkinson's dispensary, and it is only toward the end of the course of treatment that the patient is given old tuberculin.

At Dr. Hilda Clark's² dispensary, at Street, conducted on Wilkinson's lines, "the patients attend twice a week; they are weighed and have their temperature taken by the nurse, who also visits the homes and gives the necessary instruction in general hygiene. A test dose of 0.001 c.c. P. T. O. (bovine) is given, and, if necessary, increased until a reaction is obtained. Then doses of 0.005 c.c. increasing to 0.8 c.c. P. T. O. are given twice a week. This course is followed by one of P. T., and, if immunity is found not to be established to it, by one of old tuberculin (human). Cases in all stages of tuberculosis have been treated, with excellent results in a large majority. Most of the patients continued at work during the treatment. None was any the worse, except sometimes during the first two or three weeks. Some complained of violent abdominal pain after the injection."

H. Hyslop Thomson³ has suggested as the best summing up of the whole case: "(1) That inoculations with tuberculin T. R. or bacilli emulsion have a specific beneficial effect in suitable cases. (2) That the use of any milder form of tuberculin is unnecessary in cases non-reactive to walking exercise and manual labor. (3) That, in open pulmonary tuberculosis, the use of the stronger tuberculins should always be accompanied by a careful record of the temperature. (4) That the continuance of tuberculin treatment after leaving the sanatorium is desirable in many cases. (5) That the dispensary, as pointed out by Dr. R. W. Philip years ago, is a necessary adjunct to the sanatorium, and should work in coöperation with it. (6) That any adequate scheme for the treatment of tuberculosis in populous districts must have coördination of effort and unity of action, and should include sanatorium accommodation, a tuberculosis dispensary, and provision for the isolation of advanced cases."

The Forecast as to the Next Move in the Campaign. This seems to lie with the popularizing of the tuberculin method, especially in connection with the "majority" of sufferers, viz., the early sufferers among the poor and others less early, who are in need, but beyond the reach of

¹ British Medical Journal, 1911, vol. i, p. 526.

² Ibid., 1910, vol. ii, p. 1975.

³ Ibid., 1911, vol. i, p. 658.

adequate personal treatment at home or in sanatoria. There seems to be no question that, thanks to Koch's own teaching, to that of Bandler and Roepke, and to Wilkinson's insistence, the general principle of the successful ambulatory treatment by tuberculin *in carefully selected cases* has made a great step in advance. That principle claims to deal with difficulties hitherto insuperable, that of the unmanageable numbers, and that of the vast expenditure to be met, while opening up a fair prospect of a more rapid and more permanent cure, and therefore of a corresponding gain to the cause of prevention.

If a practical knowledge of the special method which Wilkinson alleges to be so successful can be disseminated, the entire field already covered by existing tuberculosis dispensaries would be available, and capable of considerable expansion for that purpose. Where dispensaries had not previously existed, their early provision would not be beyond the possibilities of municipalities or of local organizations. The financial problem would be largely solved by the preservation or the early recovery by many of their wage-earning power; and the evil of postponed application for treatment "for fear of stopping work" would find its own remedy.

In short, *the tuberculosis dispensary "plus tuberculin"* would be a practical solution likely to evolve spontaneously. The "tuberculin dispensary" has a temporary object to serve which no other institution could have accomplished so efficiently. As soon as it is clearly proved that the treatment of a large number of cases can be an ambulatory treatment, and also, for the employable and employed, a wage-earning treatment, the business of *all* dispensaries will be to apply that treatment in all suitable cases, and to deal with all other cases according to their best opportunities.

In spite of all, an atmosphere of doubt still hangs over the question, and the correspondence was brought to an abrupt closure, without any editorial summing up, after R. W. Philip, who claims to have been misrepresented, had been allowed to quote in support of his Dispensary System in Edinburgh his comparison of the mortality from pulmonary tuberculosis in London and in Edinburgh for a period of twenty years (1887-1906).

As regards America, John B. Hawes,¹ of Boston, points out that there have been at least three tuberculin dispensaries at work in the United States for the last five or six years; namely, at the Johns Hopkins Hospital, under Dr. Louis Hamman; in New York, under Dr. James Miller; and in Boston, at the Massachusetts General Hospital, under his own care: "Such dispensaries are intended not to replace, but to supplement, the work of the sanatorium, the patients being treated with tuberculin and kept under observation during the interval before

¹ British Medical Journal, 1911, vol. i.

they can be sent to an institution, and, of still more importance, after they have been discharged from the hospital and are going back to their regular work. The use of tuberculin in dispensary patients, where it is in careful and skilled hands, has met with distinct success. I have yet to hear of any instance where any unfavorable incidents have occurred which could be attributed to the fact that the patients were not under strict supervision of the sanatorium all the time. My own work at the Massachusetts General Hospital has been under the constant supervision of Dr. Edward L. Trudeau, of Saranac Lake, who has watched this experiment with interest. He has provided me with tuberculin (bouillon filtrate) and his invaluable advice."

Continuous Antiseptic Inhalation. Another "Conquest of Tuberculosis" is announced by no less an authority than David B. Lees:¹ "The statement that the treatment of pulmonary tuberculosis by direct attack upon the tubercle bacillus holds out, in the present state of our knowledge, no hope of success is no longer true. From an experience of 50 cases treated by continuous antiseptic inhalation,² I am convinced that cough and sputum are quickly diminished, the temperature soon falls to normal, there is a rapid gain in weight, the dull areas lessen, and tubercle bacilli are less easily found by the microscope, and they gradually disappear altogether.

"It seems to me to be proved that this method of treatment has certainly the power of inhibiting the development of the tubercle bacillus in the lungs. It is not necessary to keep the patient in bed for a long time. With windows open, the treatment can be carried out in his own house. This fact, with the absence of enforced idleness and the much smaller expense, is a very great gain. Even in very advanced cases the inhalation treatment often gives much relief, helps to limit the spread of infection, and enables the patient to do light work for himself or others for a much longer time."

So large a claim advanced for a remedy which cannot be classed among the truly specific anti-infective agents attacking the infection from within, on its own ground, was not likely to be accepted without searching comment.

S. H. Habershon's³ criticism carries much weight: "In a considerable number of cases, the disease is accelerated by the presence of some coincident organisms. And this is especially the case in city life. Thus, the acute and stormy pneumonic onset, and often the intercurrent pneumonia of tuberculous cases, is frequently due to the presence of the *diplococcus pneumonia*, while the associated asthma that is occasionally present in extremely chronic cases of tuberculosis may be due to the same cause, or to the presence of some other catarrhal

¹ British Medical Journal, 1911, vol. i, p. 404.

² Ibid., December 11, 1909; Lancet, November 19, 1910.

³ British Medical Journal, vol. i, p. 526.

organism. Also, many of the febrile phases of a case of chronic pulmonary tuberculosis are complicated by the presence of the *micrococcus catarrhalis*, or other catarrhal microbes of similar nature. The cases of acute necrosis and suppuration of lungs are usually accompanied by one or more of the various pyogenic organisms—streptococci and staphylococci.

To have a vaccine prepared and injected is a most difficult and elaborate process, and can only be done in a few selected cases. I am struck by what Dr. Lees affirms with regard to the influence that continuous antiseptic inhalations have upon the common cold, due to one or other of the "so-called" *infective catarrhal organisms*. So far I have formed an opinion (which I hope still further to verify), that this plan of treatment is of importance in dealing with these mixed infections of tuberculous cases. At our Frimley Sanatorium, after two or three weeks' "open air" treatment, the sputum becomes free from all other organisms except the tubercle bacillus, and this is accompanied by a corresponding subsidence of excessive oscillation of temperature. My present strong feeling is that continuous inhalation, such as Dr. Lees advises, is of great value in eliminating all these mixed infections. In many of Dr. Lees' cases the patient has been placed under recent favorable conditions as to rest, good food, and other hygienic influences at the time the inhalations were commenced.

I have come to the conclusion that this treatment aids in the elimination of extraneous organisms that invade the respiratory passages and that increase the activity of the tuberculous disease. I have not yet been able to satisfy myself that the tuberculous process itself is affected, except in this indirect manner."

Opposite remarks are also made by Edward E. Prest,¹ of the Ayrshire Sanatorium, who points out that these two "latest cures" for pulmonary tuberculosis are more nearly related than their authors imagine. "If a patient is suspected, the first thing to do is to place him in bed; if he coughs a great deal, and talks too much, it may be advisable to give him a respirator. Whether or not tuberculin should be given may be considered later. Too little is said about the mechanical effects of wearing a respirator continuously. If no antiseptic be used, a respirator may do good in the following directions: (1) It will keep the patient from talking and laughing; (2) in certain cases it will mitigate the cough. The cough is stopped chiefly by the air being warm and moist after passing through the respirator. I do not believe that the antiseptic has any effect on the tubercle bacillus."

If the inhalation of creosote should be an efficient local antiseptic for the bacillus, the inference would be in favor of its possible effect upon the pneumococcus. This treatment has been much advocated

¹ British Medical Journal, vol. i, p. 527.

by Beverley Robinson:¹ "There is absolutely nothing so simple, so effective, so harmless in the prophylactic and curative treatment of croupous pneumonia, and also of catarrhal pneumonia, as inhalations of warm creosote vapors from the ordinary croup kettle filled with water and allowed to simmer over a lamp burner or stove, in a more or less continuous manner during the inception and continuance of pneumonia." R. W. Wilcox, of New York, on the other hand, administers it internally. He relies on: (1) The continuous, persistent, and generous administration of creosote carbonate; (2) careful adjustment of mechanical conditions; (3) thorough evacuation of toxins by all possible means; (4) supplemental oxygen by inhalation, when required; (5) liquid diet until all physical signs disappear."

Mathison also gives, from the time of diagnosis, the following prescription: Potassium iodide, 1 dram; creosote, $\frac{1}{2}$ dram; rectified spirit, 2 drams; liquid extract of liquorice, 3 drams; water, to 6 ounces: A tablespoonful every four hours. The creosote limits the extension of the pneumonic process. The iodide, stimulating cell action, loosens the exudate. The fluxion is diminished by the quieting effect both drugs have upon the heart. L. Weber, of New York, prefers large hourly hypodermic injections of a freshly prepared solution of 20 per cent. camphor in almond oil, representing 30 grains of camphor per day for four days.

Lastly, D. Lees² himself has been irresistibly drawn to the conclusion that creosote inhalation should form part of the treatment of pneumonia.

This powerful advocacy of dry inhalation has called renewed attention to Burney Yeo's handy respirator, supplied by Squire, of Oxford Street, which was immediately copied by Wyeth, of Philadelphia. Its simple construction is described in the following terms by the author:

"Take a piece of paper about six inches long and four wide; fold it along the middle, and cut it with a pair of scissors into this form. This is your pattern (Fig. 1). You place this on a piece of perforated zinc, which costs about sixpence a square foot, and then, with a pair of stout scissors, you cut out a piece of zinc of the same size and form as the paper. By a little manipulation, for this zinc is very pliable, you can bring the two outer ends together, so as to slightly overlap; and then, fixing them together with a twist of fine wire passed through the holes of the zinc, you can get a suitable mouthpiece, or rather nose and mouthpiece, for it is important, I consider, to cover both nose and mouth. This can be bent to comfortably fit any face. The two middle pieces now stick out behind, and, by gradually bending first one of these down, and then the other over it, you construct

¹ American Medicine, April, 1910.

² Lancet, February, 1911, vol. i, p. 493.

a little cage behind the mouthpiece which will hold a small bit of sponge, or a bit of tow or cotton wool, or any suitable material for retaining the antiseptic vaporizable fluid. It is desirable to cover the rough edge of the mouth and nosepiece with some protecting material; a loop of elastic on each side serves to attach it behind the ears."

In his *Manual of Medical Treatment*, Burney Yeo has given the names of many authorities who have testified in favor of this treatment, including Wilson Fox, McCall Anderson, Oertel, Solis Cohen, Dreschfeld, Semmola, Shingleton Smith, Mayo Robson, and others.

Sinclair Coghill, whose inhaler has the defect of only covering the mouth, found carbolic acid and creosote, iodine, combined with sulphuric ether and rectified spirit, the most efficacious and satisfactory inhalant. Burney Yeo,¹ a staunch believer in inhalation, has used carbolic acid, creosote, and spirit of turpentine separately as well as in combination. He says:

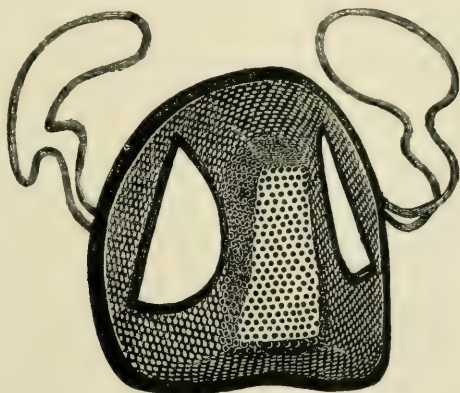


FIG. 1

"I have also used eucalyptol, thymol, terebene, oleum pini sylvestris, solution of tar in rectified spirit, tincture of benzoin, tincture of iodine, etc. Of all these, I prefer creosote, but I also frequently use carbolic acid and eucalyptol. Turpentine is a useful addition as an astringent when there is profuse secretion or a tendency to hemorrhage. I have also found it a very convenient plan to mix these substances, such as creosote, carbolic acid, eucalyptol, or turpentine, with equal parts of spirit of chloroform."

The latest modification of Yeo's simple inhaler has been suggested by Wm. C. Minchin,² and carried out by Arnold & Sons, London. The lateral openings shown in the figure, when all the edges have been strengthened, admit sufficient pure air, and provide for its free exit during expiration.

¹ Medical Press and Circular, 1911, p. 97.

² The Lancet, No. 1, 1911

In his sensible remarks upon the main therapeutic question, H. Hyslop Thomson,¹ of the Liverpool Sanatorium, dwells upon the futility of recommending one line of treatment in opposition to another, instead of insisting that the one is supplemental to the other. Modern sanatorium treatment includes both these measures; and if of such value, by how much more will they prove of value when used under medical supervision in combination with the other important details of sanatorium treatment? In the sanatorium these two distinct methods of treatment are found to yield the best results in different types of cases. "Whereas, in closed tuberculosis of the lungs antiseptic inhalations are quite useless, it is in this type that inoculations with increasing doses of tuberculin is found to be the treatment *par excellence*. On the other hand, the continued inhalation of volatile antiseptics is of great service in cases of acute and mixed infection in which inoculations with tuberculin are contraindicated."

The *possible objections* to the treatment need to be carefully considered. J. A. W. Pereira,² of Exeter, raises that of the increased respiratory activity, which is set up by wearing a respirator, instead of the pulmonary rest which has been hitherto advocated. In ulcerative tuberculosis, this might lead to capillary rupture; and he gives the instance of a profuse hemoptysis in a patient previously free from it after one week of continuous inhalation of equal parts creosote and spirit of chloroform in an elderly, chronic consumptive.

In the second place, there arises the question as to the safety of the continuous inhalation of the drugs prescribed. First, with regard to *carbolic acid*, H. Bazett,³ of Matlock, reports the occurrence, after a few days of treatment, of acute carbolic acid poisoning in one of his patients. He uses this, however, rather as a proof that the amount inhaled is not, as it has been suggested, too small to take effect as a local antiseptic. In dilated stomach, 2 to 4 minims of liquid carbolic acid t. d. s. has never, in his large experience, produced toxic symptoms. Next, as to *creosote*, the "toxic" objection has not hitherto been alleged. In the case of *chloroform*, however, it should be borne in mind that although the proportion of the drug is minimal, it is probably absorbed completely, and a long continued use of it cannot be a matter of indifference. Herbert G. Clark's⁴ observations on "The Influence of Chloroform When Repeatedly Administered in Small Doses" are a warning that we should exercise considerable caution. Sir J. Crichton Brown had previously published that certain cough lozenges were compounded with 2.9 per cent. chloroform. Clark's experiments on rabbits now suggest that if 30 to 40 linseed liquorice and chloroform lozenges were to be taken daily, they would be likely to do harm, as

¹ British Medical Journal, vol. i, p. 658.

² Ibid., 1911, vol. ii, p. 656.

⁴ Lancet, 1911, vol. i, p. 158.

³ Ibid.

each of them contains a percentage comparable to the small daily dose which proves fatal to rabbits, more or less rapidly, according as it is inhaled, injected, or ingested. His general conclusion is that the frequent repetition of small doses is much more dangerous than a single large dose. The lethal changes resembled those in man. There was always loss in weight, with pronounced degeneration in the liver and myocardium, without deposit of fat, and with intense congestion of the spleen which contained numerous very large phagocytes.

The Systematic Inhalation of Ether by the open method, on the other hand, is highly praised by R. H. Hodgson,¹ not only as in itself a remarkably efficient remedy for phthisis and for its bronchial and pulmonary complications, but also as a vehicle for various other potent drugs the toxic effects of which the ether seems to control.

Induced Pneumothorax as a Permanent Cure. L. Spengler² now reports 15 cured cases. The number treated totals up now to 102. Of these, 83 are detailed in the *Würzburg Beiträge*, xix, No. 1. J. Holmgren³ has lately succeeded in detaching by pressure of saline injection the pleural adhesions which in some cases are an obstacle. We should also note K. Wellmann's report of Matthes'⁴ 27 cases, and E. Ruediger's⁵ experimental research.

Another remedy is brought up again after ten years' experience by Thomas W. Dewar, of Glasgow—the intravenous injection of an ethereal solution of *iodoform* ($\frac{1}{4}$ to 1 grain three times a week). But John Guy⁶ states that in 35 sanatorium cases he had given full trial to the treatment without any decided benefit.

J. B. Tombleson⁷ finds good results from giving *potassium bichromate* in doses of $\frac{1}{4}$ grain ($2\frac{1}{2}$ minims of a 10 per cent. solution in water), either alone or in a tonic mixture (phosphate, hypophosphite, or simple iron), a wineglass of water after food, at first twice and later three times a day. The first dose, and possibly the second, may cause vomiting; but, in his experience, toleration is easily established without missing a dose.

CHEST DIAGNOSIS

Dorsal Percussion is still much neglected. A general review of the subject was recently given by the writer,⁸ including a new "Stomach Sign in the Thorax," and vertebral percussion for glandular, spinal, and other diseases (see last Report, p. 24). The value of the latter is due

¹ Proceedings Royal Medical Society, 1910, vol. iii, Part 1, p. 10.

² Münch. med. Wochenschrift, February 28, 1911.

³ Ibid., September 6, 1910.

⁴ Würzburg Beiträge, xviii.

⁵ Ibid.

⁶ British Medical Journal, 1911, vol. i, p. 366.

⁷ Lancet, November 19, 1910.

⁸ Proceedings Royal Medical Society, June, 1910.

to the pleximetric conduction for sound possessed by bony structures; and the same applies to auscultatory conduction.

Dorsal Auscultation. *D'Espine's Sign* is based upon the loud conduction of the whisper and of the voice when auscultated over the upper dorsal spine, for the diagnosis of enlarged glands. Roch¹ points out that it is available also in the adult for malignant adenopathies, etc. J. H. Barach² devotes an article to the same practical method, and finds that typical bronchial breathing may be conducted to the tip of the acromion.

The Acromion Symptom of O. Kuthy is identified by C. A. Crispolti³ as the same as Bacelli's old "scapular angle sign," namely, delay in the respiratory excursion of the scapula on the side affected.

Apical Diagnosis involves an acquaintance with the occurrence and causation of "functional atelectases" of the apex, previously dealt with in our reports. The puzzling "atypical" examination results which they yield are discussed by D. von Hansemann,⁴ who connects them with Freund's abnormally small upper thoracic aperture, and by E. Laser,⁵ who refers the blowing breathing to another individual peculiarity, that of an unusually wide lumen of the right bronchus. But in reality the true explanation will be found to be the great prevalence, particularly in girls, of slight lateral curvature, to which the writer has long called attention.

Useful Helps in Examination for phthisis are: The method of F. C. Smith, of Fort Stanton, to time the patient's auscultatory "cough" by a tap-signal with the finger; the local "muscular rigidity" of Pottenger; and the "local tenderness" upon pressure of C. Sabourin.

For Early Diagnosis, E. F. Trevelyan⁶ recognizes the importance of the apical percussion methods of Krönig and of Goldscheider, and to a less extent of radiography. He practices the skin test extensively, and the conjunctival less; they are useful, although not localizing. The subcutaneous test is valuable owing to its focal reaction. "Early" and "curable" are not always synonymous terms. As to prognosis, there are three main groups—of complete healing, of possible return to work, and of permanent disability. He has used tuberculin extensively as the only specific treatment, first by the mouth, but latterly almost exclusively by subcutaneous injection.

"Biot's Breathing." L. A. Conner,⁷ in describing this variety of respiratory arrhythmia, characterized by (1) varying and irregular periods of apnea, (2) constant irregularity in rhythm and in strength,

¹ Semaine Méd., February 22, 1911.

² American Journal of the Medical Sciences, December, 1910.

³ Il Policlino, January 15, 1911.

⁴ Berliner klin. Wochenschrift, January 2, 1911.

⁵ Ibid., January 23, 1911.

⁶ British Medical Journal, 1911, vol. i, p. 442.

⁷ American Journal of the Medical Sciences, March, 1911.

and (3) frequent sighing, calls attention to the great uniformity he has observed in the expiratory level.

The Venous Hum sometimes heard in the epigastrium and its varied explanations in connection with a hepatic, coronary, thoracic, or other derivation are studied by W. S. Thayer¹ in a paper worth consulting.

The Typhoid Bacillus and the Respiratory System. Follet and Bourdinière² call attention to the principle that the most diverse affections may be caused by every known microorganism, as, for instance, by the pneumococcus, meningococcus, and others. Eberth's bacillus, however, was supposed to be limited to the production of enteric fever. It has since been recognized by a number of observers as a primary infection in the thyroid, the lungs, and the meninges. The authors detail two cases of suppurative pleuropulmonary disease in which the *Bacillus typhosus* was identified by cultures, and proved by inoculations to be one of feeble virulence. Their conclusion is that the bacillus of Eberth is not exclusively specific, but capable of determining ordinary infections, such as angina, abscesses, pleurisy, and pneumonia.

THE PLEURA AND ITS TREATMENT

The Intrathoracic Pressure Effects of Right Pleural Effusions. Professor A. C. Geddes³ has published two important notes on the mechanical effects of right-sided effusions, from observations made in the cadaver, after the double vascular method of preservation which causes the majority of the tissues to retain an almost life-like consistency, while the heart, liver, and kidneys are firmly fixed, and the lungs partially fixed. To this end the arteries are injected under low pressure with a "corrosive-carbolic-glycerin" preservative, and the venæ cavæ and their tributaries to the first valves, with 15 per cent. formalin. In the second case, all the tissues were firmly fixed; and the appearances, which are given in great detail, are therefore reliable. Moreover, they are clinically most instructive, as the effusion was not of extreme bulk, but such as may be met with in normal practice.

In both cases, the mediastinum was bowed by the pressure (the maximal leftward displacement occurring at its middle third, at the level of the pulmonary roots), owing to the mooring of the mediastinal structures below to the diaphragm by means of the inferior vena cava and of the attachments of the pericardium, and to the mooring of the great vessels, trachea, and esophagus to the margins of the upper thoracic inlet. In both of them, also, the apex of the heart had swung downward "like the hand of a clock when it is moving from the quarter

¹ American Journal of the Medical Sciences, March, 1911.

² Progrès Médical, January 14, 1911.

³ British Medical Journal, June, 1910, vol. i, p. 1409, and 1911, vol. i, p. 246.

to the half hour," and had indented the left lobe of the liver. The liver itself was depressed in both cases, as a whole, and was not slanted from left to right, but was practically horizontal, presumably in connection with the above-mentioned rotation of the heart on its sagittal axis at the level of the orifice of the inferior vena cava. The occurrence of this rotation itself necessarily implied a downward bending of the extremity of the left lobe of the liver under the pressure from the heart.

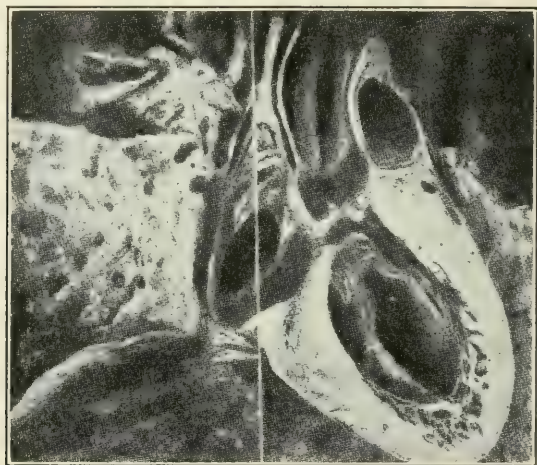


FIG. 2.—Coronal section through the heart on a plane $\frac{1}{2}$ inch anterior to the anterior lip of the inferior vena caval opening. To show the kinking of the inferior vena cava, the downward rotation of the apex of the heart (slightly exaggerated in the photograph), and the bowing of the mediastinal structures. The white line is vertical, but on a plane a short distance to the right of the middle of the body of the last dorsal vertebra. It passes through the left margin of the inferior vena caval opening, around which point the rotation of the heart occurs.

There was no collapse or adhesion of the right lung or its lobes. The trachea is slightly moved to the left with inclination of the right bronchus forward. The esophagus is "curiously crumpled" by the pressure of the right pleura, and slightly displaced to the left.

"The left lung is compressed, and is, in its lower part, adherent to the chest wall.

"The superior vena cava is somewhat compressed laterally, and is displaced toward the left. Its lumen is seriously reduced by the pressure exerted upon it, from behind forward, by the right pulmonary artery, which has in turn been pushed forward by the right bronchus (Fig. 2).

"The ascending portion of the vena azygos major is pushed into the median plane; the portion which normally arches over the root of the right lung is pulled out to lie in a horizontal plane, and is bent very sharply against the right posterolateral edge of the trachea at the

level of its bifurcation. At the point of bending, the lumen is entirely occluded."

The descriptions given in the last three paragraphs, and borne out by the other illustrations, have great significance, particularly as relates to the almost complete occlusion of the inferior vena cava, and to the great diminution in the capacity of the right auricle.

Professor Geddes is "confirmed in his opinion that one cause of sudden death in cases of right-sided pleural effusion may well be occlusion of the great veins as they approach the heart, and more especially occlusion of the inferior vena cava." The suggestion is not a new one, but it has not received general acceptance.

He also calls attention to the fact that the descending aorta has been pushed clear of the left side of the vertebral bodies, "in partial explanation of the area of dulness" described by Grocco.

The extreme importance of these conclusions justifies unreserved comment. The "compression of the left lung" (in ordinary right effusion, *the breathing lung*), and its adhesion below to the chest wall tend to give the case away in two essential directions: First, as representing not the rule, but the exception; and secondly, as suggesting that "the compression," and the *angular* kinkings described, which are so unlike the usual effects of pressure *intra vitam*, as found at autopsies when completed soon after death, were probably due to the influence of gravitation during the interval of maceration. Some support for this assumption may perhaps be contributed by our remarks "Concerning Somatic tone, Elasticity, and Lateral Pressure," on page 49 of this report.

Empyema. Howard H. Mason gives a practical account of the *diagnosis* by physical signs in the two types of free fluid and of limited collections, for the distinction between them is essential. Pulsating empyemas are generally left-sided and may form a subcutaneous bulging. He also dwells upon the diagnosis of empyema from lobar pneumonia and from subphrenic abscess. The latter subject was thoroughly handled by Henry Roth, in the *Journal* of February 18, 1911.

THE TREATMENT OF DOUBLE EMPYEMA is discussed by M. B. Fabrikant¹ with the conclusion that both sides should be opened at once, under Schleich's local anesthesia, if the condition of the patient should permit it; but that a few days' interval is better. With wide interspaces, any rib resection may be avoided.

Suppurating Pleural Calcification. A remarkable case of successful surgical treatment is recorded by W. Sidney Sweet,² in which calcareous plates were removed at three successive operations in a man, aged fifty-nine years. Some sinus oozing from the collapsed left side still persisted after one year and ten months; but the patient was practically

¹ Deutsche Zeitschrift für Chirurgie, vol. cvii, Nos. 5 and 6.

² British Medical Journal, 1911, vol. i, p. 17.

well. Meanwhile the marked osteo-arthropathic swellings had rapidly disappeared after the operations.

"Calcinosis," or Diffuse Generalized Calcification of the Connective and Subcutaneous Tissues, might be mentioned in this connection. It is described by J. Lhermitte,¹ as an anatomical and clinical syndrome, capable of affecting both sexes and more liable to occur between the ages of eight and twenty. It bears no relation to any of the infections except perhaps syphilis. Beyond this we are not given any clue to its etiology.

The "Perflation" Method of Evacuation of Pleural Fluid Collections. This was the name given to a method described by the writer² in 1886, and in a joint paper with R. F. Benham.³ Its principle had, however, been foreshadowed, as he found subsequently, by Rose. I. Holmgren⁴ has recently rediscovered the method, and applied it in 17 cases under the title of "Ausblasung anstatt Aspiration von Pleuraergüssen." His method is as follows:⁵ "Air is pumped in at an opening above, to take the place of the effusion as it is forced out below by the pressure of the instreaming air. This technique prevents the slightest change of pressure in the chest, as the pressure is automatically regulated, and there are no manipulations to discommode the patient. The pumping in of the air is done with a double bulb in the hands of an assistant, the interposed tube being several feet long to make it more convenient for the patient. The operator watching over the two puncture needles can inspect and regulate the inflow of air and outflow of fluid. The pleural effusion can thus be forcibly blown out to the last drop without the patient's feeling the slightest discomfort. The puncture is made in the tenth interspace between the scapula and axillary line, the region being first painted with iodine and the patient being seated. The spot where the lower cannula is to be introduced is anesthetized by injection of a 1 per cent. solution of cocaine. By this means, it proved possible to remove 3200 c.c. of a tuberculous pleural effusion without the patient's feeling anything more than an agreeable sense of relief. In another case, 3100 c.c. and 2000 c.c. were thus removed at two sittings. The technique described has the advantage that the procedure of evacuating the pleura can be supplemented by pumping air or gas into the cavity to induce therapeutic pneumothorax as indicated."

This procedure is in most essentials identical with that described as "perflation" in the papers above referred to. An important point is to secure freedom of outflow. Too small an opening, or the use of a tube of insufficient caliber, is open to the risk of blockage by clot or false

¹ *Semaine Méd.*, 1910, vol. xxx, No 47.

² *Lancet*, vol. ii, p. 226.

³ *Proceedings Royal Medical and Chirurgical Society*, New Series, vol. ii, p. 221.

⁴ *Hygica*, Stockholm, September, 1910, and *Mitteilungen aus der Grenz.*, etc., 1910, vol. xxii.

⁵ *Journal of the American Medical Association*, January 2, 1911.

membrane, with the possible danger of setting up undue intrapleural pressure. As a matter of fact, the best course, and in ordinary cases it is quite sufficient for the purpose, is simply to provide a supply of filtered air at the ordinary atmospheric pressure, which allows the fluid to be completely drained by gravitation. For that purpose the seat of election for the opening of outlet is not the extreme base of the pleura, but some spot in its lateral convexity which can be most readily made, by posture, the most dependent spot in the lateral decubitus.

It may be mentioned incidentally that, in this harmless form, the same method was successfully applied by the writer to the complete evacuation of the ventricular fluid in chronic hydrocephalus, and to its conversion into a "pneumocephalus." This treatment, which has the advantage of removing the fluid pressure upon the brain as well as the great weight of the effusion, and of restoring to the patient the power of moving the head, which is apt to be lost as that weight increases, is described in a paper contributed jointly with his lamented friend, the late Dr. Lee Dickinson.¹ As the evacuation, in this instance, has to be slow and carefully controlled (by clips), and as the fluid is free from any solid matter, the use of small trocars and cannulæ, and of small tubing is indicated. The relief afforded is great (but unfortunately temporary, although the tendency is curative), both owing to the alterative action upon the ependyma, and to the substitution for the pressure exerted upon the brain substance and its blood and lymph circulation, of a steady negative pressure as the gases left in the cavity in replacement of the fluid are gradually absorbed. Nitrogen might be preferable to air for the sake of its slower rate of absorption. The fluid slowly accumulates again, and after a few weeks the operation has to be repeated. This method has not hitherto, it would seem, been put to the test by other observers.

THE LUNG AND ITS TREATMENT

Kuhn's Induced Passive Hyperemia of the Lung. E. Kuhn² reviews four years' experience with the "mask." It has proved very favorable in various cardiac and pulmonary affections, including asthma and emphysema, and in phthisis. The red cells increase in the peripheral circulation, as in the altitude. Drowsiness is induced by the mask in dogs as well as man. Might it be of use in insomnia?

The Relief of the Asphyxia of the Newborn by Placental Aëration as described by M. H. Freund³ is an important addition to our measures of rescue. The child was placed in a basin of warm water, the placenta

¹ British Medical Journal, 1901, vol. ii, p. 602.

² Therap. Monats., September, 1910.

³ Medical Record, February, 1911.

being held exposed to the air, maternal surface upward, and washed free of blood clots with warm water. After a few minutes, though no attempts at respiration occurred, the color improved, as well as the pulsation of the cord. A stream of oxygen took still stronger effect. After thirty-five minutes the child cried lustily and the cord was cut and tied.

"Mouth to Mouth" Artificial Respiration for the Newborn has now received physiological approval to the extent that it supplies the respiratory stimulus of CO_2 in the insufflated air. But as there is already an excess of CO_2 in the tissue, it is indicated that the operator should charge his lungs with oxygen, or else take a preliminary series of deep breaths. J. A. Braxton Hicks¹ points out that in the "stillborn" the application of the method leaves no means of determining whether the resulting appearances are due to spontaneous or to artificial inflation only.

The Inhalation of Oxygen Freely Bubbled through Absolute Alcohol in a wash bottle is recommended by W. H. Willcox and B. J. Collingwood² in heart failure as an efficient means of quickly improving and slowing the pulse and raising the blood pressure. If the effect should pass off, the inhalation should be renewed.

The Treatment of Cough. In whooping cough, the following prescription is reported from Paris³ as especially efficacious:

Ichthyol	2 drams
Glycerin	5 drams
Spirit of peppermint	3 drops
Cherry laurel water	2 drops
Syrup	4 ounces

From birth to one year, 4 to 6 teaspoonfuls; from two to four years, 3 to 4 dessertspoonfuls; from five to ten years, 4 to 5 dessertspoonfuls.

PUERPERAL TUSSIS, a "hammering and straining" reflex, neurotic cough, comparable to that of pertussis, is apt to produce widespread and varied damage. Stewart,⁴ who describes it, avoids morphine, but treats it by warm alkaline baths and, if necessary, veronal, to induce sleep. A simple mixture of ammonium chloride and syrup of wild cherry is sufficient medication, and galvanism is soothing.

Electrargol for Bronchopneumonia has been used intravenously by H. Perrier,⁵ of Fribourg, in 47 cases, in daily injections of 5 c.c. for children, and of 30 to 40 c.c. in adults. Electrargol is one of the two forms of colloidal silver, the other being collargol. The lowest recorded mortality in children averaged 45 per cent. in any year, while at the Lausanne

¹ British Medical Journal, November 5, 1910.

² Ibid., 1910, vol. ii, p. 1091.

³ Medical Press and Circular, 1911, p. 339.

⁴ New York Medical Record, 1911, p. 341.

⁵ Revue de Méd. Suisse, October 22, 29, 1910; Lancet, 1911, vol. i, p. 954.

Hospital it reached 60.8 per cent.; the reductions of his rate of mortality to 23.4 per cent. is noteworthy. The temperature rises during the first and second hour, but subsequently falls. A leukocytosis occurs, with eosinophilic increase. The material is supplied in sterilized ampoules.

In 1901, I¹ communicated to the London International Congress on Tuberculosis a note on the "Silver Treatment for Phthisis by Intravenous Injections of Collargol." At that time I also used them with remarkable results for the treatment of pneumonia. The following year collargol injections were tried and favorably reported upon in Paris by M. Netter² and by Jousset.³ In spite of the surprisingly rapid and great fall effected in the pneumonic temperature, I abandoned that treatment, partly because of the rigor which was apt to occur soon after the injection (almost invariably a *single* injection), but chiefly because I found that the simple and absolutely harmless method described in the *Principles of Treatment of Pneumonia*⁴ yielded results so eminently satisfactory that it was unnecessary to resort to any other. I have no personal or other experience of the silver treatment in bronchopneumonia. In view of the still prevailing fatality of the affection Perrier's report must command attention.

Long prior to Netter's communication, however, B. Credé,⁵ of Dresden, had introduced into Germany (1897) his well-known preparations of colloidal silver for the treatment, by injection or by inunction, of infectious disorders; and Netter⁶ gives useful references to the extensive literature which was devoted to the study of the method.

The Treatment of Paroxysmal Pulmonary Edema. A. Stengel's⁷ discussion of this strange affection, based upon a study of 5 cases, does not lift the mystery of its etiology beyond suggesting a probable connection with a temporary pulmonary engorgement, due to a sudden disproportionate working between the left and right ventricle, together with an increased vascular permeability. After the immediate administration of sal volatile at the earliest threatening, the effect of an injection of morphine sulphate, $\frac{1}{4}$ grain, with atropine sulphate, $\frac{1}{250}$ grain, possibly to be repeated and followed later by injections of strychnine and nitroglycerin, may be so effectual as to render other lines of treatment unnecessary. Chloroform also controls the attacks. In one case, with a record of seventy-two distinct attacks, it relieved the patient in from ten to thirty minutes. But as a routine it can hardly be recommended

¹ Lancet, 1901, vol. ii, p. 308.

² Soc. Méd. d. Hôp., December 12, 1902, p. 1088, and Bull. Soc. d. Pédiat., 1903, vol. xxi, p. 35.

³ Compt. rend. Soc. d. Biol., 1903, vol. lv, p. 943.

⁴ Lancet, 1905, vol. i, and Fol. Therap., October, 1907.

⁵ Archiv f. klin. Chir., 1897, vol. lv; Klin.-Therap. Wochenschrift, April, 1898; Berliner klin. Wochenschrift, 1901.

⁶ Loc. cit., 1902.

⁷ American Journal of the Medical Sciences, January, 1911.

because of its possible dangers in cardiac disease. Theoretically, nitroglycerin and the nitrites should be useful, but practically both fail entirely, and possibly because in cases of persistent high pressure and arteriosclerosis the vasomotor mechanism has been exhausted and vasodilatation has ceased to be available. Venesection also will relieve the condition; but, compared to the simplicity of a hypodermic injection of morphine, it can hardly be more prompt or satisfactory. The only question is whether perhaps, in severe recurrent cases, it may not fulfil the causal indication where sedatives may merely act as palliatives.

Samuel West,¹ who described two adult cases with a pneumococcal derivation, and who infers that Laennec's acute suffocative catarrh is usually an acute bacterial infection, makes the significant statement that, in the case (a unilateral one) which recovered, a copious hemoptysis had occurred.

In Asthma, Anaphylaxis is the latest idea in all current studies; but definite conclusions are still wanting. Barach, of Pittsburg, and others have failed to demonstrate anaphylactin in the blood. Raymond Wallace suggests in the *Medical Record* that insufficiency of the suprarenal glands may account in the asthmatic for any dangerous reaction to serum, and that a preliminary hypodermic injection of suprarenal extract might be a prophylactic, by rehabilitating the vasomotor system. Billard² believes that neuro-arthritis, and especially asthmatics, are the subjects of a constitutional anaphylaxia which has either been acquired or is inherited, as suggested by Richet's remarkable experimental results.

R. Hoffmann³ also adopts the view that the internal secretions are closely connected with the production of the phenomena. The thyroid and the suprarenals might both be regarded as accumulators for the area of the vagus and for that of the splanchnics respectively. Thyroid excess, by increasing the irritability of the vagus, would favor bronchial asthma, and in hay fever it would heighten the susceptibility of the mucous membrane to certain alien forms of albumin. E. Friedberger⁴ pursues the same idea, on the assumption that anaphylaxis is nothing more than a peracute form of infection; and ordinary infection a less acute form of anaphylaxis. He uses the behavior of the temperature, with its characteristic sudden drop in anaphylaxis and its remittent type in infection, as the basis of a forensic test for differentiating albumin, as he finds that one and the same substance will produce, in animals, either anaphylactic shock in a large single injection, or the symptoms of bacterial infection in small repeated doses.

Anaphylaxis could hardly fail to furnish an increased roll of casualties if the use of diphtheric antotixin were to be generalized for school

¹ British Medical Journal, 1911, vol. i, p. 872.

² Lancet, October 22, 1910.

³ Berliner klin. Wochenschrift, October 17, 1910.

⁴ Ibid.

prophylaxis. Its cautious employment might be demanded during some outbreaks. But we cannot shut our eyes to the possibilities suggested by Goodall.¹ Some subjects, even though not declared asthmatics, are peculiarly susceptible; while in others a dangerous susceptibility for any subsequent treatment that might become necessary might thereby be developed gratuitously.

The same number contains C. Morgan's account of a rare case of severe angioneurotic edema, without visceral symptoms, from a dose of 5 grains of aspirin.

Adrenalin Nebulizations have been found by G. Zuelzer² of much value in acute catarrh of the upper air passages.

The Study of Compressed Air Illness, of Its Treatment, and of Its Prevention is likely to gain by contrast rather than to lose any of its interest from the advent of the "Rarified Air Illness" incidental to aviation. Our most useful facts are those recently established by Boycott, Damant, and Haldane: (1) The nitrogen is the main trouble; (2) the risks increase with time of exposure up to about five hours, when nitrogen saturation of the body is reached; (3) symptoms rarely occur, however long the exposure, until the excess of pressure rises above 1.25 atmospheres; and (4) gas embolism of the pulmonary, or else of the spinal vessel are almost invariably the cause of death.

The fact, important in aviation, that the human body tolerates a sudden reduction down to normal of a hyperatmospheric pressure 225 per cent. above it—in other words, that within that limit the re-expansion of the tissue gas is not such as to do damage—makes it safe to decompress from any pressure-excess by instalments of reduction of *one-half*, or 50 per cent., at a time. This "stage decompression," which they recommend in replacement of the slow continuous decompression, has been most successful since it has been introduced into practice.³

Leonard Erskine Hill,⁴ in his important paper based upon considerable experience, while endorsing the main conclusions of the Admiralty Committee, finds that the decompression times which they recommend are unnecessarily long, particularly if the men can be prevailed upon to exercise their muscles during decompression.

QUESTIONS OF VENTILATION

Stagnant Air and Moving Air. The art of fanning is as old as civilized architecture which has provided closed temples and assembly rooms

¹ British Medical Journal, February, 1911.

² Berliner klin. Wochenschrift, February 13, 1911.

³ Journal of the American Medical Association, 1911, p. 968.

⁴ Medical Press and Circular, 1911, p. 272.

to crowd people into; and the punkah must date back to the earliest invasion of the tropics by cool-air-breathing races. The art has been long practised, but it has hardly been discussed; for we still lack the word for it in reasoned language. We are only now being made conscious of the need of such a word.

AIR AGITATION AND VENTILATION are as distinct in their nature as in their verbal derivation. "*Ventilation*" in its strict etymology is the setting up of a wind, the action of the wind. We have extended its use to the action of *draughts*, and to their production. In both instances there is some renovation of a confined air supply, usually by the introduction of outer or *fresh air*. "*Air agitation*" is the new expression for the old experience of "fanning" the confined air which we fail to renew.

This distinction opens up fresh lines of inquiry. Hitherto our study of ventilation has been restricted to the analysis of the changes in re-breathed air and of its experimental results. The merits of the agitation of the air in the absence of its renovation have not received any consideration. We owe to Leonard Hill the inception of that study.

MOVING AIR *versus* FRESH AIR. A determined challenge to our orthodox principles of ventilation has been thrown down by Leonard Hill on the strength of his experiments on continued rebreathing of the stale air of a confined space. The symptoms which inevitably result under ordinary conditions are obviated by simply keeping the air moving by efficient fans. The inference which he derives from this observation is that much of the virtue of "fresh air" supplies consists in their movement.

THE EVILS OF STALE AIR have long been known to science. It has but one good point. But that isolated single merit had been until quite recently least suspected of being a virtue, and most of all attacked as a "*summum malum*." Stale air accumulates CO₂, and that accumulation is not only absolutely harmless up to a proportion of 2 per cent., or even more, but positively beneficial. It is, indeed, our only saving clause against an entire set of deleterious effects. For it arms us against them by insuring an increased respiratory activity, and therefore as large an intake as may be obtainable of the steadily diminishing oxygen supply. It is superfluous to refer again to the experimental proofs which have been given of the "respiratory function" of our alveolar CO₂ as the originator and the regulator of our respiratory impulses (Haldane); or to the ready demonstration of it by Leonard Hill's homely experiment of breathing in and out through a broad tube of moderate length such as may be cut out of a bicycle tire.

THE REFRESHING EFFECT OF AIR AGITATION *per se* is shown by Leonard Hill's¹ latest experiments, which are reported in the *Journal*, to account in some large measure for the advantage which we derive

¹ Journal of the American Medical Association, 1911, p. 1048.

from breathing in the outer air or in any current of it admitted into a room. In any confined, crowded atmosphere, the discomfort is due to excessive heat and moisture, and not to carbon dioxide. We cannot radiate heat because we are all of the same temperature, nor evaporate it because of the hygroscopic saturation, and there is no circulation for the air entangled between our bodies. The remedy is to make it circulate freely, and thereby to promote cooling by evaporation and a better oxygen supply. The "open air treatment" is not altogether a matter of fresh air supply, but mainly a constant cooling of the body which has power to make us eat more and be more active.

Humidity in its relation to the problem of ventilation has also been recently dealt with by D. D. Kimball¹ upon similar lines.

DRAUGHTS AND COMMON COLDS. It is worth noting that both the German and the English idiom designate such a movement of the air as a "traction, a drawing, *Ziehen*, *Zugluft*, or a draught." F. A. Philippi² proceeds to explain how truly we are thus placed under a process of air suction. Unlike the pressure of wind, that is, of a great body of air from a distance, which causes a contraction of the superficial capillaries, the cold draught from the gap or slit close by is not equal in bulk to the amount which could be taken up by the warm space above and around us. Its tendency is to dilate the capillaries under the influence of subnormal pressure. This fundamental physical difference was pointed out by Herz, of Vienna. There is set up, then, for the production of chills, rheumatism, catarrh, etc., a local process of "undue cooling with distended bloodvessels." Given some individual feebleness of vasomotor accommodation, "draughts" must become then and remain injurious.

R. C. Macfie³ takes the more Spartan view that draughts are a wholesome discipline for vasomotor incompetence or lethargy. They may play an auxiliary part in the etiology of colds, but they are easily deprived of their dangers and should be favored rather than feared. Upon this heroic view our only comment is: *Experto crede*.

The Insidious Danger of Slow Carbon Monoxide Poisoning is the text of Courmont, Morel, and Mouriquand's report to the Académie de Médecine (lxxiv, No. 41) on 35 cases of inhalation, during working hours, of contaminated air (1 in 1000 to 10,000 CO₂) from slightly defective hot air radiators, gas jets, gas ranges, etc. The symptoms were of the well-known type, including instances of hyperchlorhydria, and of intermittent albuminuria. The pallor, faintness, debility, neurasthenia, etc., are slow to be recovered from, and apt to be diagnosticated, according to age, as due to pretuberculosis or cancer. Cases may prove fatal from syncope even after a long interval.

¹ Annals American Academy of Political and Social Science, March, 1911.

² British Medical Journal, 1911, vol. i, p. 116.

³ Ibid., January 14, 1911.

The Hygienic Aspects of Gas Lighting and Heating have been investigated by F. S. Toogood, at the Lewisham Infirmary, who writes in the *Medical Magazine* for February, 1911: (1) As to the relative values of the open fire and of the gas radiator as warming agents; (2) as to the extent of any effect of incandescent burners and lamps upon the quality of the atmosphere of a room; and (3) as to the hygienic value of the gas fire. The determinations made were as follows: (1) The estimation of the CO_2 present; (2) the estimation of the humidity; and (3) the estimation of the temperature.

The experiments prove conclusively:

1. That even in small apartments with normal ventilation, gas consumed in modern incandescent burners is not detrimental to health, but in fact assists ventilation.

2. That a gas fire, properly constructed, does not vitiate the air, but is a valuable adjunct to the ventilation of the room. Its advantages in the sick room are its reliability, avoidance of noise, freedom from dust, and saving of work and anxiety.

3. That in large, well-ventilated rooms, flueless gas stoves can be used without any hygienic disadvantages, the CO_2 and water vapor ascending quickly above breathing level. A ward or other public building in which gas radiators cannot be used with advantage is improperly ventilated.

THE CARDIOVASCULAR SYSTEM

Mechanism of the Normal Circulation. "THE FACTORS THAT MAKE FOR AN EFFICIENT CIRCULATION," as discussed at the last Annual Meeting¹ of the British Medical Association by some of the chief authorities, furnish us with an epitome of the latest teaching on some of the most advanced physiological questions.

Prof. E. A. Schäfer tells us that the effective action of the heart, depending upon (1) rhythm, (2) force of beat, and (3) tone, is adjusted by the nervous system through the cardiac nerves (*viz.*, through the *vagi*, to moderate the rate, diminish the force, and lower the tone; and through the *sympathetic*, to increase the rate, the power of beat, and the tone, in response to a peripheral stimulation of the *cardio-inhibitory* and of the *cardio-accelerator centre*, arising from all parts, including the higher nerve centres as well as the bloodvessels and the heart itself.

The efficiency of the respiratory apparatus—and this includes the *tone of the abdominal muscles* (Leonard Hill)—by helping to charge the heart, raises its force with its load; while its rate is concurrently checked by the *vagi*.

¹ British Medical Journal, 1910, vol. ii, p. 1331.

The increased coronary blood pressure is also a direct stimulant. That pressure acts *per se*, apart from nutrition, as, for instance, when an isolated mammalian heart is started beating again by injecting liquid paraffin instead of oxygenated saline.

The tone of the bloodvessels (disregarding any propulsive effect that may belong to the slow rhythmic contractions they occasionally exhibit) is the indispensable adjunct to the cardiac systole in maintaining the circulation; while the direction of the flow is determined (with the help of the aortic valve and of the valves of the veins) by the pressure being maximal in the aorta and minimal in the veins. Flaccid tubes, such as fully relaxed bloodvessels, would dilate, and would be incapable of passing on the blood to the heart.

The modulation of that muscular tone is also, as for the heart, due to the peripheral stimulation of *vasomotor centres* from all parts, *via* the vasoconstrictor and the vasodilator nerves. The vasoconstrictor nerves run with the motor nerves, except that they are distributed through the sympathetic; whereas most of the vasodilators run with the afferent nerve fibers (Bayliss) and have their origin or distribution along with these; or they may even be identical with them. In this reflex way the peripheral stimuli, according to their derivation, determine the *general* and the *local* variations in tone. This *reflex nervous mechanism* of the circulation has been worked out on the basis of the pioneer discoveries of Bernard and of Ludwig. But it does not explain, without the unproved assumption of peripheral ganglia acting as local reflex centres, the retention or the recovery of some amount of tone, when parts of the vascular system have been completely cut off from the central nervous system.

A *chemical agency* has now been discovered as the solution of this mystery, that of the glandular secretions influencing the tone and contraction of the heart and the contraction of the bloodvessels, chiefly those of the medulla of the suprarenal capsules, and of the posterior lobe of the pituitary body. While an extract of suprarenal medulla increases both the rate of rhythm and the tone of cardiac muscle, and strongly stimulates to contraction the muscular tissue of the bloodvessels (with the exception of those of the heart and perhaps also of the lungs), an extract of the pituitary body, though it markedly raises the tone of the cardiac muscle, does not increase its rate of rhythm, but may even diminish it; and, while producing constriction of nearly all the arterioles in the body, tends to produce a dilatation of those of the kidney, associated with an increased secretion of urine.

The blood flowing from the *suprarenal capsules* can, in fact, be shown to contain a larger amount of the pressor substance of the extract than ordinary blood. Probably, either directly or indirectly (through lymph channels or by the cerebrospinal fluid), this occurs in the case of the pituitary body also. The supreme importance of these glands for the

circulation is shown by the equally fatal result of a removal of either of them.

The pituitary contains also a depressor substance which diminishes the force of the heart and inhibits the contraction of the arterioles; but the action of this is usually far overbalanced in the artificial extract by the material which produces the opposite effects. It is, however, possible that naturally the two substances may be passed into the blood in such proportions as the requirements of the vascular system and of the organism in general appear to indicate. If this be the case, there would be a balancing action caused by the materials of the secretion comparable to that caused by the nerves which influence the contraction of the vascular musculature.

The direct action upon the heart and bloodvessels of *the hormones* produced by these organs—perhaps also by other ductless glands—only represents a portion of their influence in increasing the efficiency of the circulation. It is probable that they also assist the nervous factors by their beneficial action upon the nerve centres themselves. In the instance of the pituitary body at least, there appears to be evidence, mainly of a clinical character, that its extracts exert a tonic effect upon the nervous system in general. Such an effect is manifest in cases of shock, and may under normal circumstances be presumed to assist in maintaining that condition of tonus of the nerve centres, which is essential to the performance of their functions; not the least important of which is, as we have seen, their action in maintaining the proper balance of the circulation.

THE CARDIOVASCULAR ADJUSTMENT to physiological work, as was suggested by George Oliver, though it is mainly effected by nerve controls, may also be served by the diastolic aortic pressure, which, being proportionate to the resistance, may link up the preiphery to the ventricle. Again, the reserve capacity of the veins plays an important part in this adjustment, in providing for reduction or augmentation of the volume of blood on the arterial side of the circulation during the conditions of rest and work.

Vascular Tone varies with the individual and with his conditions. It is raised by sleep, rest, good food, and a well-balanced metabolism; and is lowered by work, worry, strain, insufficient rest and sleep, and by whatever impairs the nutrition of the body generally, and of the brain in particular.

The Influence of Posture is not considerable when the vascular tone is normal. But the difference is quite marked between the smaller pulse of standing and the voluminous pulse felt just as the patient assumes the recumbent position, whenever the system is weakened by any cause, such as hemorrhage, anemia, asthenia, and especially exhaustion or weakness of the nervous system. This can now be measured by Oliver's arteriometer.

The Arterial Pressure is apt to rise momentarily on recumbency in those whose vasomotor control over gravity is diminished. In many this slackened tone may be quickly restored by rest, sleep, and food. But in others suffering from various asthenic ailments, chronic fag, worry, or shock, the depression of vascular tone is not only more pronounced, but it is continuous for some time, until it is made good by prolonged rest, or by rest judiciously alternated with exercise, by extra feeding, by guarded massage, and by vasomotor tonics. There is also probably such a thing as a "splanchnic" vasomotor inadequacy explaining syncope, vertigo, and even quasi-epileptic sudden lapses of consciousness.

Excessive Vascular Tone is exemplified in its local variety by Raynaud's disease; and in its general variety by the high pressure induced by faulty blood, as contracting kidney and chronic goutiness.

"Irritability of the Arteries" is assumed by Oliver to be a probable explanation for the rapid rise of arterial pressure under psychic and other influences, in many elderly subjects in whom we might have anticipated some abeyance of vasomotor activity. Possibly this increased contractility may in some cases be necessary to secure the requisite speed of the capillary blood flow in the declining years; and therefore it may be a factor which makes for efficiency in the circulation.

WHAT IS THE RELATION OF ARTERIAL PRESSURE TO EFFICIENCY IN THE CIRCULATION? This is still a question. While efficiency must mean a certain rate and pressure of capillary flow to insure adequate metabolism and the complete return of blood to the heart, the systolic pressures varies widely in individuals, as from below 100 to over 200 mm. of mercury. But we do know that the medium pressure of the average normal individual, ranging from 100 to 150 mm., is associated with a more stable circulatory efficiency than any other.

Leonard Hill compares the body to "a wet sponge enclosed in an elastic skin—the pores as small as in a clay filter, their lining as thin as soap films." The heart drives the blood through the arteries; the muscles squeeze the blood in the sponge, back through the veins. In the liver, the varying turgor of the cells and the respiratory movements have a profound effect. In the villi, the muscle cells drive both blood and lymph. Peristalsis does the same for the gut; and the entire abdomen is thus under the influence of the respiratory pump.

THE CAPILLARY FLOW is favored by the pulsatile expansion of the organs; while the living cells of the glands separate and transfer the secretion from capillary to ductule. "The pressure in such an organ as the brain or kidney is the same throughout the organ, and is equal to the capillary venous pressure. The tissue fluid, cerebrospinal fluid, lymph, and urine are at the same pressure as the capillary venous pressure. The conditions are such that there can be *no filtration pressure* as is usually supposed.

"In the contracting heart and clinched fist we see the blood squeezed

out of the capillaries and the pumping action of the muscles demonstrated. In great running efforts, the muscles are exsanguined to such an extent that lactic acid is produced, owing to want of oxygen. The pressure, both in the arteries and veins, is high in the forearm when held dependent, while it becomes *nil* in the capillaries immediately after clinching the fist. The capillaries are blanched, and until the sponge refills, we have the paradoxical condition of a high pressure in the artery that feeds and the vein that drains the part, and no positive pressure in the capillaries. This is a constantly occurring condition of the circulation, and depends on the squeezing effect of muscular movement, and on the valves in the veins."

Measurements of the Capillary Pressure are obtained by means of a hollow needle, connected with a glass tube filled with water and containing an air bubble index; this tube being connected with a manometer and a syringe. The pressure which is needed to overcome the capillary pressure can then be measured. L. Hill finds this equal to 50 to 60 mm. of water in edema and in hydrocephalus. The capillary venous pressure must just exceed the fluid pressure, for otherwise the circulation would not proceed. He does not, however, explain the cause of that excess. *The fluid pressure* itself has its origin in the circulation, as on death any positive pressure, other than that due to gravity, immediately disappears.

In hydrocephalus, after tapping, the pressure falls to atmospheric pressure; but it rises again in two or three days as the fluid secreted by the choroidal fringes distends the cavity once more.

In the metabolic activity of *inflammation*, the tissue turgescence and the capillary pressure increase together. An encapsulated organ, such as the marrow, exhibits congested vessels with shrunken cells, owing to the migration of cell substance into the blood. If, in a rigidly encapsulated organ, there is more tissue fluid, there must be less blood; the bloodvessels will be narrower, the capillary venous pressure higher, and the blood flow faster. The conditions vary from congested bloodvessels and from stagnant flow and shrunken cells, to that of taut bloodvessels, rapid flow, and turgid cells. A sudden increase of arterial pressure does not alter the volume of blood in an encapsulated organ, but increases the rate of flow through it. The capsule of the organ and the skin are of no little importance in the mechanism of the circulation.

"The man in good condition, like the wild animal, is 'hard,' with muscles like iron, bloodvessels tightened up, a rapid blood flow, little fluid in the tissue spaces, a maximum turgidity of cells, no superfluous fat, and a taut skin. The Röntgen rays afford no evidence that the heart is dilated by severe muscular work. The heart appears *smaller* during the subsequent stage of dyspnea. Muscular exercise and exposure to cold winds are the causes of metabolic change. Hot, moist atmospheres congest the skin, lessen muscular and metabolic activity,

and slacken the cerebral circulation." A very hot bath may produce faintness, a fall of pressure down to 60 mm. of mercury, and a pulse rate up to 150—all to be relieved at once by a cold douche to constrict the cutaneous vessels.

As regards the influence of the horizontal, the standing, and the inverted position on the systolic blood pressure in man, this shows no variation in the brachial artery, but considerable variations in the tibial. The influence of gravity is compensated for in the inverted posture by the lessened output of the heart and by the dilatation in the splanchnic area. The nervous mechanism which thus keeps the pressure constant in the ascending aorta must act continually.

Leonard Hill finds that "the conductance of the crest of the pulse wave depends upon the arterial wall. A soft artery with open peripheral field will not conduct the wave as well as a more contracted and rigid artery. In all cases of aortic regurgitation, the systolic pressure is much higher in the tibial arteries than in the brachial. The leg arteries are in these cases kept more taut, and the systolic crest is a very high one. The cause of the difference must be mainly in the conductance of the wave along the aorta. Inequality of pressures due to aneurysm of the arch are caused by the soft sac lessening the conductance of the crest."

THE NUTRITION AND FUNCTION OF THE HEART MUSCLE, according to Sir James Barr, "are dominated by the nervous system, and the tone and irritability of the muscle enables it to respond to stimuli directly. Just as for the knee-jerk, the maintenance of the reflex arc is necessary; but the response is much quicker than a nerve reflex. The healthy cardiac muscle responds at once and directly, except during the refractory period, to the variations in the diastolic pressure within the heart."

Each side has its own work to perform, to a certain extent independently of the other. The right side is more sensitive, and its contraction ordinarily responds to less than an atmosphere of intracardiac pressure; while the left side requires rather more than an atmosphere to start an efficient contraction. The contraction is almost invariably started in the right side; and in the doubling of the first sound, which in a healthy heart occurs at the beginning of every deep inspiration, the first element is due to the tricuspid valve. If the systole were due to any myogenic stimulus travelling along the bundle of His, then both healthy ventricles should start their contraction absolutely synchronously, without any of that common dissociation in the beginning and ending of their systoles.

If a patient faints, we should not wait for the sino-auricular node to start ticking again, or try any artificial respiration; but simply hang the patient up by the heels to raise the diastolic pressure within the right auricle and ventricle, which starts their contraction; and the left side will soon follow suit. Many a case of sudden death he is convinced might thus be averted.

RESPIRATION AID THE CIRCULATION, especially through the right heart. In a case of so-called heart block, Barr could stop the pulse and induce an epileptic seizure by making the patient hold his chest fully expanded. The blood was delayed in the lungs, owing to a feeble right heart, and enough of it did not reach the left. "Both in Valsalva's and in Müller's experiment the heart becomes smaller and smaller, until it is not more than half its former size."

AN ELASTIC AORTA is absolutely essential for an efficient circulation. The velocity in the aorta, estimated at 320 mm. per second from physiological experiments on animals, is, Barr thinks, underrated. It might be accurately calculated in any individual from the fall in the pressure gradient.

AORTIC AND ARTERIAL VELOCITY. A low systolic and a relatively high diastolic pressure give a slow but steady velocity, and do not strain the elastic coats of the aorta. The difference between the diastolic and systolic pressures is that portion of the cardiac energy which is not stored up in the elastic walls of the vessels, but is used as the effective head of the liquid. If there be no great disparity between them, the velocity is comparatively slow and fairly uniform during the whole cardiac cycle, though of course rather quicker during the systolic period. For an effective circulation, the arterial diastolic pressure should always be more than sufficient to overcome the resistance of the arterioles and capillaries, and the viscosity of the blood. Otherwise the circulation of the main arteries would come to a standstill toward the end of the diastolic period of the heart.

As the arterial velocity depends upon the energy or effective head, minus the resistance to the outflow (in the aorta the viscosity can be left out of account), a great disparity, such as occurs in free aortic regurgitation, gives defective storage, and the velocity becomes very great, especially during the cardiac systole. When the difference exceeds 40 mm. of mercury, the elasticity of the aorta is becoming impaired. In chronic granular kidney, when the arteries are contracted, and the systolic and diastolic pressures very high, we do not get *tortuous* arteries; but, when the arteries are dilated, and there is a great difference between the systolic and diastolic pressures, we get longitudinal straining of the arteries, the greater curve of the arch of the aorta gets dilated, and the muscular arteries become tortuous.

"A fall in the pressure gradient in the aorta from 100 to 80 mm. of mercury gives a theoretical velocity per second of 525 mm. of blood. A pressure of 150 mm., and a resistance of 120 mm. of mercury give a blood velocity of 640 mm. A fall in the pressure gradient from 150 to 100 mm. of mercury gives a blood velocity of 1120 mm. per second; by this time the elasticity of the aorta has been seriously damaged, and its repair should not be intrusted to an amateur. With a systolic pressure of 250 mm. and a resistance of 120 mm. of mercury, which

often occur in free aortic regurgitation, the velocity would be at the rate of 2450 mm. in the second, which would chiefly occur during the cardiac systole with marked recoil of the heart at the end of systole, and positive and negative waves in the circulation which obstruct one another."

When failure begins, the diastolic pressure in the left ventricle is great, this cavity is dilated, the elasticity of the aorta is seriously impaired, and storage of the energy in its wall is very defective, the pressure and the velocity are more or less intermittent, there is an enormous waste of energy, and failure is bound to occur rapidly and perhaps suddenly. In the foregoing calculations, mercury, which is 13.6 times heavier than water, has been reckoned as thirteen times heavier than blood.

THE ROLE OF CALCIUM. In addition to the suprarenal and the pituitary secretions which are essential to life, the presence of calcium ions is necessary for all effective muscular contraction. All the soluble lime salts increase the viscosity of the blood and lessen its ready transudation through the capillary walls. The arterioles form the first line of resistance to the outflow and perhaps the main factor in arterial pressure; but Barr is convinced that the *viscosity of the blood* in the capillaries is an important element in maintaining high arterial pressure; and that one of the most important causes of this viscosity is calcium. This is not readily appreciated, as calcium is a slowly acting drug. It is absorbed with difficulty, and the blood can only hold a limited quantity; moreover, the resistance from viscosity is a variable quantity and takes time to develop a cardiac hypertrophy. On the other hand, the free use of decalcifying agents lessens the viscosity of the blood and rapidly lowers the arterial blood pressure, affording indirect evidence of the effects of calcium in raising it. Blair Bell has given us a reliable method of estimating the lime salts in the blood.

THE CAPILLARY CIRCULATION is chiefly carried on by *vis a tergo* and to a less and more variable extent by muscular contraction. Barr believes that physiologists have very much underestimated the velocity in the capillaries, which they set down at 0.5 mm. per second, from observations on the frog. Vierordt reckoned the velocity in the retinal capillaries. If he had inverted the subject he would probably have found that the velocity was so great as not to be determinable by this method. Barr estimates the capillary velocity by compressing the blood out of a flat network of capillaries, say the back of the finger or hand, and then timing, with a stop-watch recording fifths of a second, the period it takes the blood to return. The hand must be held *at the level of the heart*.

If we divide the radius of the compressed area by the return time of the blood, we get the velocity per second. Barr usually employs a rod 10 mm. in diameter, the radius of which is 5 mm.; but as the red cells travel in the axis of the capillaries and occupy about four-fifths

of their lumen, he reckons the actual to be about four-fifths of the observed velocity. Therefore, we should divide 4 mm. by the time of the return to get approximately the actual capillary velocity. If we lower the finger about 320 mm., we double the capillary velocity. In observations on the web of a frog, we can visibly increase the velocity by raising the body of the frog $\frac{1}{2}$ inch or 1 inch. The arterioles are then not able to keep the open capillary bed full, and the blood commences to run backward in many of the capillaries.

If the velocity in a warm hand at the level of the heart be less than 4 mm. in a second, as a rule there is too much lime in the blood, or the heart's action may be very feeble. If it is less than 1 mm. in the second, the blood gets surcharged with CO_2 —witness the hand on a cold day or the liver under ordinary circumstances. If it falls to the "physiological" standard of 0.2 to 0.5 mm. per second, we can take up the refrain, "the hour of my departure's come."

THE PRESSURE IN THE SYSTEMIC VEINS depends on three factors: (1) The obstruction to the inflow to the chest; (2) the hydrostatic effect of the column of blood; and (3) the energy transmitted through the capillaries. The velocity depends on the *vis a tergo*, and varies enormously. Here the fall in the pressure gradient from the periphery to the centre is the determining factor. The velocity is calculated by Barr by emptying a long piece of vein between two valves and then timing with a stop-watch the period it takes the blood to fill the empty vein. He has seen 23 cm. of a vein in a dependent arm filled in 0.2 of a second—a velocity of 115 cm. in a second, a velocity greater than ordinarily occurs in the aorta. He claims to have been the first to discover the fact that venous blood runs more quickly up the hill than it does down it. In a vein of the arm the velocity is sometimes five times greater when the arm is hanging than when it is held horizontally at the level of the shoulder. The total amount of blood passing through a limb in a given time may be two or three times greater when the limb is dependent than when it is elevated. Muscular contraction is also an important agent in hurrying on the venous blood.

Concerning Sir James Barr's estimate of the high velocity "uphill" in the vein which had been kept emptied by pressure with the arm dependent, is this not merely due to the rapid refilling of the collapsed vein by *syphon action*?

Lastly, Alexander Haig restated his well-known views on uric acid and blood pressure (see "Uric Acid in the Clinic," London, 1910): "The quantity of uric acid in the blood can be easily measured by the Barker-Smith process; and for its clinical estimation the capillary circulation measured by my own method and instrument is a reliable guide.

"A single dose of uric acid taken by mouth can be watched as it passes through the blood by means of half-hourly observations of the capillary circulation.

"Thus in every direction is capillary circulation a measure of the quantity of uric acid present in the blood. And this, I submit, could not be the case if the capillary circulation was chiefly controlled by the nervous system, apart from uric acid. I conclude from these and many other facts that the high blood pressure so commonly met with today is the result of the numerous uric-acid compounds in our foods and drinks."

CONCERNING SOMATIC TONE, ELASTICITY, AND LATERAL PRESSURE. The following views may be quoted from my recent work. The *Intra-vascular* circulation, which was that discussed at the debate on "Efficient Circulation," is essentially a matter of pressures; and their factors, muscular, nervous, elastic, and harmonic, coöperate in varying the resistance of the containing vessels as a means to elicit cardiac power, and to distribute its effect. *Its capillary* section is that which is least understood. The *extravascular* circulation is mainly one of biochemical and biophysical forces.

But there is surely a gap in the scheme. It seems to have been overlooked that these variable containing vessels are in reality themselves contained within the fluid of a larger container. The extravascular fluid upon which they *dilate*, is no less incompressible than the intravascular fluid, upon which they *contract*. We are not told anything about that other and equivalent phase of their oscillation, nor of the pressure which it exercises, nor of the resistances which are opposed to that pressure by their living container. The key to the problem of "capillary pressure" is the behavior during life of the *somatic container*, which is analogous to the vessel wall of the *vascular container*, and is subject to analogous forces. *The energy* is the lateral pressure transmitted from the heart pump by the incompressible fluids. *The resistances* are, as in the vessel wall, those of muscular contraction and of elastic tension.

The simile of "a wet sponge contained in an elastic skin, such as our skin, or such as the capsule of any of our organs," is not altogether an adequate illustration, as may be gathered from (1) the behavior of the wet sponge when we have provided it with its "elastic envelope," and (2) the different behaviors of the "extravascular fluid pressure" before and after death.

Leonard Hill has gone so far as to demonstrate, by his hollow needle manometric method, that after death the conditions governing that pressure are immediately altered to those of gravitation. He does not, however, proceed to explain the mechanism which, during life, suspends the operation of gravity.

Let us watch the wet sponge, when it has been lying duly protected from desiccation by its slightly stretched elastic envelope. What do we find after it has stood for a while? Although it preserves its dampness, and also, by virtue of its elasticity, its shape, the mass of the fluid has

gravitated to its lower part, provided access of air has not been excluded.

I have elsewhere pointed out that the elastic function of our elastic fibers is the only one of our functions which is left in operation within us after death. Their elasticity remains perfect; and it endures for so long as the fiber is not destroyed by decomposition, or by desiccation, as in a mummy. This explains why the dead body, like the dead sponge, roughly speaking, preserves its shape, in spite of the gravitation of its fluids. The lost function which during life prevented that gravitation is not therefore the elasticity of the elastic fiber; it is that of all the rest of our fibers and of our tissues, which have no elasticity of their own, but all of which are rendered elastic in proportion to the tone which is kept up within them. At death, that elasticity disappears together with the tone; and with them the pressure which they opposed during life to the intracapillary pressure.

It is essential to note, however, that, in a limb deprived of its *muscular tone* by complete severance of its nerve connection with the spinal cord, the capillary circulation does not give evidence of that total loss of the tissue tone which is exhibited in death. The whole of that remaining tissue tone cannot therefore be due to innervation. It is presumably due to the action of the hormones circulating both in the blood and also out of it.

Assuming the combined operation of this double somatic elastic resistance, we may now suit the facts by modifying our conception of the simile of the sponge. We need simply imagine that the sponge has not only the advantages of a single peripheral envelope, such as the skin; but during life has an infinity of elastic membranes pervading it, and everywhere checking the force of gravitation. Or else we may imagine an infinity of minute sponges each with its own elastic envelope. In the living body that pervading elastic resistance apparatus is made up of two agencies—our undying truly *elastic soft tissue skeleton*, or "skeleton of configuration," and of our *mortal tonic soft tissue skeleton*, or "skeleton of pressure." The latter would seem, from the result in death, to be the predominating partner in the work of maintaining the requisite pressure in our somatic container, and of managing the fine adjustment of that practical equality between the intra- and the extracapillary pressures which physiology now claims to have established.

The pervading elastic apparatus now referred to would also account for the mechanism, left unexplained by Leonard Hill, of the immediate return of tissue fluid fulness, and of the normal capillary pressure, to those parts which had been squeezed empty by the powerful pressures of posture or of the contraction of our skeletal muscles.

This view of the mechanism of the extravascular circulation was suggested to me by Yandell Henderson's illuminating researches on the *Acapnial Causation of Shock*. They have also opened up for us

another new field for study in indicating that the same vital tone may preside over the *venous function* in the circulation, and may be administered to us during life by the selfsame stimulation, that of CO₂. A striking evidence in support of that view had passed under my eyes twenty years ago, but had not suggested to my mind its most obvious explanation.

In the course of my former clinical study of the therapeutic effects of CO₂ inhalation, I obtained from its systematic use in leukocythemia so remarkable a reduction in the size of the spleen that I was led to hope that a cure had been found. My first thought was of a direct effect upon the leukocytes. However, as improvement only, and no cure was achieved, I concluded that the effect must have been mainly mechanical and respiratory, and partly perhaps brought about by improved blood aëration, but mainly by the greatly increased range of the respiratory movements, and particularly of those of the diaphragm and abdominal muscles. In some measure that view may prove to have been correct. The simpler explanation, however, never occurred to me, that the mechanical effect might have been primary, not secondary; and the shrinkage not merely passive, but in the main an active shrinkage, by contraction of the fibers and of the veins of the spleen under stimulation by CO₂. Thanks to Yandell Henderson, this important method of treatment has now acquired a fresh claim to be tried and to be further studied by clinical therapists.

Mechanisms of a Disturbed Circulation. AURICULAR FIBRILLATION. Thomas Lewis,¹ working with the electrocardiograph, which has already verified most of the findings of the polygraph while surpassing it in being able to localize the seats of origin, in the cardiac chamber, of the contraction waves, confidently asserts that fibrillation is *the actual condition in delirium cordis*, as well as in 50 per cent. of all *irregularities of the pulse*; and that it most commonly heralds the final breakdown. In *paroxysmal tachycardia*, it identifies two chief varieties—(a) the form due to fibrillation crises, and (b) the form due to “the awakening of new impulse formation in the heart muscle from some point other than the normal source.” It also supplies information in heart block.

It is fortunate that electrocardiograms should have been secured by M. Pekar and E. Tezner² in their remarkable case of *ectopia cordis*.

Bernheim³ treats of “Asystole” in the old-fashioned broad sense of insufficiency of the heart for its double function as a forcing and aspirating pump. This ends in a rupture of the hemodynamic equilibrium; and leads to a fall in the arterial, and to a rise in the venous pressure. As the insufficiency has its origin in the most varied organic vulnerabilities and lesions, he proposes to classify the asystoles as “arterial,” “venous,”

¹ British Medical Journal, 1911, vol. i, p. 871.

² Jour. f. Kinderh., September, 1910.

³ Jour. des Prat., October, 1910.

"aortic," "hepatic," "pulmonary," asystole, etc. This would surely produce hopeless confusion.

Hering¹ describes the derivation of the functional disorders from the disturbance of the special cardiac muscle systems, on the basis of the latest observations and theories as to the sinus node and the auriculo-ventricular node.

Landis and Munford's² study of the cardiorespiratory and sub-clavian murmurs, especially frequent in phthisis, leads them to trace the causation to variations in the intrathoracic pressure connected with the systolic contractions of the heart; the precise mechanism of the variations is, however, difficult to define.

We owe to Fulton, Judrow, and Norris³ a record of 3 cases of *congenital heart block*, one of them an infant, occurring in one family.

AS TO THE MECHANISM OF PAROXYSMAL TACHYCARDIA, Professor K. F. Wenckebach,⁴ who refers to Aug. Hoffmann's "an-atrial" heart-action, concludes rather in favor of the persistence of the normal rhythm. He agrees with my⁵ interpretation of the absence of any major dyspnea, as negating the presence of any pulmonary or cardiac overload; though he cannot admit the possibility of a causation from splanchnic vasomotor failure and accumulation. He would rather assume some reflex disturbance of the central heart regulation. His novel suggestion is that there exists a *critical heart frequency rate of about 180 per minute* (variable with individual variations in conductivity), at which the auricular systole catches up the ventricular. This he designates as a "Pfropfung" (?occlusion) of the auricular systole. He considers that this would explain the absence of major dyspnea, and the low blood pressure, without resorting to the assumption of a splanchnic vasodilatation.

FAINTING AND HEART DISEASE. The most striking aphorism in J. Goodhart's⁶ Lecture on Heart Strain is: "Organic heart disease never faints." Might I add?—"but if it should, then never again." It is quite true that in severe organic disease we cannot afford to faint. The conclusion follows that fainting belongs to the "functional" province; and this is part of Goodhart's general theme. (1) There are many fallacies to avoid in the diagnosis, by physical signs, of cardiac "dilatation," so often diagnosticated in error. We are worse off with unreliable or ill-mastered methods than with our plain clinical sense without them. (2) Worse fallacies are those which beset the prognosis valuation of genuine dilatations when found. (3) Worst of all fallacies are those of a therapeusis misguided by spurious findings.

¹ Arch. d. Mal. du Cœur., etc., March, 1910.

² American Journal of the Medical Sciences, November, 1910.

³ Ibid., September, 1910.

⁴ Deut. Arch. f. klin. Med., Band ci.

⁵ British Medical Journal, 1910, vol. i, p. 724.

⁶ Lancet, November 26, 1910.

Edema and Its Causation. The "mechanical" or "capillary pressure" theory of dropsy has now been completely abandoned for that of capillary malnutrition, as illustrated by Cohnheim's experiment of long-continued anemia of the rabbit's ear, and by Lazarus Barlow's experiment of completely depriving a limb of its blood for one hour; also by Cohnheim's observation that, although ligature of the femoral vein causes no edema in a healthy dog, it will do so if the animal be first rendered hydremic by bleeding repeatedly at intervals of a few days. Of course, the more watery plasma will filter through more readily. Starling sums up that: "Edema can never be brought about in the limbs by a moderate rise of venous pressure, provided that the capillaries retain their normal impermeability. Edema will occur as soon as the permeability of the vessels is increased." "The lymph obtained under these circumstances is found to be more concentrated than that normally flowing from the limb, showing that the permeability of the capillary wall has been increased." Starling is unable to thoroughly explain the fact that in Bright's disease the edema fluid is less concentrated, instead of there being an increased amount of protein as in increased permeability of the capillary endothelium. He is therefore inclined to attribute the causation to the accumulation of substances of low molecular weight in the tissues, and to the osmotic attraction of fluid by their means.

An analogous view has since then been propounded by Fischer as applicable to all forms of edema.

For urticaria and angioneurotic edema Starling does not admit a direct nervous origin, but "believes that all cases of so-called nervous edema can be explained by the circulation of some lymphagogue substance in the blood combined with local vasodilatation, which may often be hysterical or central in origin.

FISCHER'S COLLOIDAL THEORY OF EDEMA. The most complete and satisfactory account yet given of the problem of edema is that contained in Professor Martin H. Fischer's¹ Prize Essay. "It is increased acidity that leads to edema." The tissues take up more water, just as fibrin, gelatin, an excised eye, or the tightly ligatured leg of a frog swell in acidulated water.

In heart disease, its chain of causations is obstructed circulation, deficient blood flow, diminished oxygenation, acid production, and increased hydrophilic property of the tissue colloids. The central chemical agency is "deficiency of oxygen."

Edema may be produced experimentally by ligaturing the blood-vessels—in the kidney, for instance, by ligaturing either the renal artery or the renal vein; or in the liver the hepatic artery, but not the portal vein; and in the lung, the bronchial arteries. The lateness in the super-

¹ Philadelphia, 1909, cf. *British Medical Journal*, 1911, vol. i, p. 772.

vention of the pulmonary edema of disease is well accounted for by the circumstance that the bronchial arteries arise so near to the seat of the highest aortic pressure.

The Influence of Acid upon the Colloids. The sequel is *acidification* of the tissue fluids, and an alteration, leading to increased hydration, of the different colloids constituting the substance of the cells.

Facts and Fallacies Concerning the "Backward Pressure" Theory. These observations must cause us to revise the old assumption of a filtration due to an excess of the backward pressure supposed to extend into the capillaries. Is there such a thing as "backward pressure?" It may be admitted that, as arrest of the heart pump completely stops the circulation, its impairments, whether from obstruction or from weakness, would mean partial stoppage, with blood delay and accumulation at the venous end, where normally the driving power is almost *nil*. This result is of familiar observation. The accumulation is progressive and extends up stream, passing valve after valve, and finally distending the liver and other organs with "passive congestion" and its structural results. With these facts any experiments have to harmonize their conclusions.

The misunderstanding is largely one as to the acceptation and range of the term "backward pressure." *Active* backward pressure from cardiac systole occurs only in arteriovenous aneurysm, as when the superior vena cava is ulcerated into by an aortic aneurysm. *Passive* backward pressure by weight of accumulated blood is constantly before us. While in health the external jugular vein is empty of blood and of pressure, except during forced expiration, we behold it permanently filled in some of our cardiac patients. There is no need for us to postulate that this fulness must mean "positive pressure;" our finger can gauge it. We can see it, too, and gauge it "backward," up stream, in the tributary cutaneous veins. There can be no doubt that positive backward pressure does get set up within the venous system. And yet there need be no swelling, and no edema.

"*Is There any Backward Pressure within the Capillaries?*"¹ is the real question at issue. "To arrive at clear notions, let us contrast the deep veins of the arm with those at the surface. The same pressure obtains within them, but they are not allowed to swell so freely. The pressure of their tough supporting sheaths is equal to the venous pressure within. The capillaries have no sheaths, but they are equally supported. The nature of that support has perhaps not been fully described. The support is mainly that of the lateral hydrostatic pressure bearing upon the outer surface of the capillary membrane, and almost equal to the pressure within. But this is not all, as we may learn from the swollen liver in early states of passive congestion."

¹ The following views, special to the writer, are quoted from the same source (*loc. cit.*, 1911).

Elastic Tissue Tension, and Extracapillary Pressure. "The fact is clinically demonstrable that a swollen liver may shrink, under successful treatment, within a few days, perhaps even hours. It will shrink also on the *postmortem* table as the blood escapes from its distended veins. In both instances, the collapsing force is the recoil of our tissue elasticity—of our all-pervading *elastic skeleton*. That force is part of the lateral pressure which supports the capillary membrane from without. The other, probably greater, part of it is of *muscular* origin. It is contributed by the systole of the left ventricle, which by keeping the vessels distended within the tissues communicates to their fluids a lateral pressure which is sufficient when combined with that of the elastic tension of the tissues themselves, to equal the intracapillary pressure.

"This description given in connection with the liver applies to the deep circulation of every part of the body. At rest, our internal lateral pressures are in the last resort everywhere compounded in varying proportions of the heart's systolic pressure and of the elastic tension of our soft tissue skeleton, thanks to which latter each part and each feature preserve their configuration, in spite of any temporary disfigurement by swelling or by shrinkage.

"Within this general outline of the scheme there are subordinate workings into which we need not enter. External and postural pressures, and our muscular activities are intermittent factors of lateral pressure. Cellular activities too are always at work. But the greatest interest for us attaches to the varying behavior of the vessels in the matter of elasticity of muscular tone, and of contraction. In these three directions the behavior of the arteries has been much studied and described; much less that of the veins. We owe to Yandell Henderson's remarkable work some novel suggestions as to the existence in the venous system of a vascular tone analogous to that of the arterial system, but governed by a totally distinct mechanism. To this we shall refer under a separate heading, as the question in hand, that of backward pressure and of edema, cannot be thoroughly discussed independently of that new factor and of the contributory share it must possess in all the mechanisms involved.

"The views which have just been expressed may suffice to explain why the backward venous pressure, demonstrable in valvular and other heart affections, may reach the capillaries and probably does reach them, and yet does not distend them. That intravenous pressure, converted into lateral pressure in the same way as the arterial pressure, thanks to the elasticity of our tissues, would go to the making of that extracapillary pressure which protects the delicate film from all internal tension. And this would negative the notion that edema is a filtration through that film under excess of internal pressure."

In the collateral subject of *lymph formation*, the same conclusion

is urged upon us by the work of Ascher and of other observers. Capillary pressure cannot be the factor, as a vasodilatation such as that induced by stimulating the cranial salivary nerves will not lead to an increased lymph flow from the salivary lymphatics if atropine should have been used to paralyze the salivary secretion. But as the flow is largely increased when secretion is allowed to occur, Ascher ascribes the lymph formation to "tissue activity." And again its independence from blood pressure is displayed in still more striking experiments showing that "the flow of lymph may be increased some hours after death by the injection of certain lymphagogues, when no circulation exists." It would thus appear that "the transudation of lymph must depend on alterations of the tissue metabolism and on the chemical state, the osmotic pressure, and the surface tension phenomena."

Nutritional Colloidal Changes in the Capillary Wall and in the Tissues as the Cause of Edema. The rejection of the mechanical pressure theory entails the adoption of the alternative view, that of some undue permeability of the capillary wall owing to tissue change. That view, first advocated in our own literature by Lazarus Barlow, has passed through variations under the influence of progressive discoveries, particularly in connection with toxemia. The damage to the capillary has been largely ascribed to the action of toxins, autogenous or imported. But the experimental work of Martin Fischer has reasserted the simplicity of its original statement as "a degenerative change from faulty nutrition." We owe to him a clear demonstration that it is not the overpressure from stagnant blood, but its diminished circulation and its deficiency in oxygen that disable the capillary membrane and the tissues; and that the damage which causes them to soak up water consists in the alteration of their colloidal state produced by the acid phase which is set up by the anoxemia.

Yandell Henderson's Acapnial Theory of Shock. The following are Yandell Henderson's final conclusions in the *American Journal of Physiology*, November, 1910, vol. xvii, No. 1, p. 174:¹

"Traumatic shock and toxic shock are in all essential features identical. In both, the circulation fails in the same manner as after hemorrhage. It is illogical to call this condition 'vasomotor failure,' for in shock the heart is still functionally capable, and the vasomotor system is in a high degree of activity.

"The essential failing element in both shocks is the venopressor mechanism. The venopressor mechanism consists in part of the tonus of the tissues, and in part of osmotic processes."

"The tonus of the contractile tissues is largely dependent upon the content of CO₂. This tonus prevents stasis, by compressing the capil-

¹ See vols. xxi, 1908; xxii and xxiv, 1909; xxv and xxvi, 1910; also J. D. Malcolm, Transactions of the Medical Society of London, 1909, vol. xxxii, p. 289.

laries. When it is diminished by acapnia, the blood stagnates in the venous reservoirs."

"The tension of CO_2 within the body is regulated by the respiratory centre. Thus, this centre exerts an indirect, but powerful, control over the venopressor mechanism."

"The essential sequence of events in acapnial shock is: (1) Hyperpnea, (2) acapnia, (3) failure of the venopressor mechanism (or sometimes sudden fatal apnea), (4) venous anoxemia, tissue asphyxia, and acidosis, and (5) acute oligemia."

These few propositions are a condensed statement of Yandell Henderson's acapnial theory of shock based upon "failure of the venopressor mechanism." A brief description of the leading features of his investigation may help us to grasp some of the significance of this new departure, that is, of the *venopressor function* which he ascribes to the carbonic acid dissolved in the blood, and of the production of shock by a diminution of the normal amount of it.

This inadequacy of the CO_2 supply was originally described by Mosso (1897) under the name of *Acapnia*, as the cause of the respiratory and other symptoms of mountain sickness. It is to this lack of CO_2 as the "hormone" or "chemical regulator," not only of respiration, but of the tone of our veins and of our tissues, that the joint failure of the nervous system, of the respiration, and of the circulation in shock, and the cessation of respiration in true apnea, should be attributed, according to Henderson.

The most recent and accepted theory of shock was that independently evolved by Crile,¹ and by Romberg and Pässler,² from the observation that the arterial pressure falls. They concluded from this that the essence of shock was "vasomotor failure." This was soon, however, to be disproved. Malcolm, Seeling and Lyon, and others, including Yandell Henderson, were able to demonstrate beyond question that, except at its terminal stage, the vasomotor system is not paralyzed, but conspicuously active during the continuance of shock. Indeed, Crile himself, in analyzing the mode of death in experimental surgical shock, induced (in dogs) by exposure and irritation of the abdominal viscera, says "that in 103 of the experiments in which the exact manner of death was recorded, or in which, in the course of the experiments, the heart or respiration failed first, respiration alone failed in 90, the heart alone in 4, and both simultaneously in 9; in many instances, the heart was beating strongly and the blood pressure was fair at the time respiration failed;" and he was obliged to employ artificial respiration in order to keep his animals alive until the low blood pressure developed.

Henderson's experience was precisely the same, and he contends that "after intense pain, but in the absence of hemorrhage, death usually

¹ Surgical Shock, 1899.

² Deut. Archiv f. klin. Med., 1899, vol. lxiv, p. 652.

results from failure of respiration before arterial pressure has fallen to a dangerous level." Even during the final stage of low arterial pressure, if the respiration can be kept going sufficiently long for that stage to be reached, "the fact is that the small arteries are contracted, not relaxed."

The "paralysis" must clearly be that of *some other factor* of the circulation. And as the heart could be shown to retain its functional adequacy, Henderson was led by exclusion to seek it in the venous and capillary district; and to rise from a conclusion that theirs must be the failure, to the further conception that, in the maintenance of the normal circulation, they must take an active share of corresponding importance, although hitherto this had been unsuspected.

THE MECHANISM OF THE FAILURE OF THE CIRCULATION appears "to be a diminution in the volume of the blood by transudation of its fluid out of the vessels into the tissues, a process like edema. It is a complex peripheral process induced initially by the influence of acapnia upon the veins and capillaries and upon the tissues."

THE MECHANISM OF THE FAILURE OF THE RESPIRATION is thus described by Henderson: "At first the excessive breathing diminishes the CO₂ content of the blood. If, at any time after this condition of acapnia has been induced, the pain is greatly diminished and the respiratory centre is thus allowed to relapse into a standstill, fatal *apnea vera* may occur. If, on the other hand, the pain is sufficiently continuous to keep the respiratory centre continually excited then apnea is prevented, and the condition of acapnia becomes more and more acute and general until the circulation fails, and the subject sinks into surgical shock according to Crile's definition."

He points out that the respiratory centre is not automatic, but requires to be driven by CO₂, and that "it has been conclusively demonstrated that within wide limits the respiratory centre is wholly indifferent both to excess and to lack of oxygen." He recalls the saying of Miescher thirty years ago: "Over the oxygen supply of the body, CO₂ spreads its protecting wings." "After they are withdrawn, death ensues from lack of oxygen."

THE ACAPNIAL CAUSATION OF APNEA VERA has been conclusively established by Haldane and Priestley's demonstration of the extraordinary constancy of the CO₂ tension of normal alveolar air, to a fraction of 1 per cent. While the oxygen tension may vary by more than one-third without producing the slightest modification in the activity of the respiratory centre, "the addition of 0.2 per cent. CO₂ to the air doubles automatically a man's pulmonary ventilation."

THE VOLUNTARY PRODUCTION OF ACAPNIA (Haldane and Poulton) and of the resulting apnea is simply a matter of keeping up forced breathing until all desire to breathe is extinguished. This apnea leads, after two or three minutes, to intense anoxemia; and the *acidosis*

bodies then formed, adding their stimulus to that of the CO_2 which is gradually restored to the blood, start the breathing once more before the CO_2 tension is quite fully restored. There is therefore "apneic relapse" as soon as enough oxygen has been inspired to remove the acidosis and to suppress its contributory stimulus. This amounts to a typical reproduction of Cheyne-Stokes breathing in a healthy man. Vernon has established a remarkable record in prolonging his own period of apnea after forced breathing from three or four minutes to eight minutes and thirteen seconds, by taking two or three inhalations of oxygen after the forced breathing.

The Experimental Evidence. All the animals "were anesthetized or otherwise drugged to the point of complete unconsciousness. It is not the consciousness of pain, but the *effect of pain* (*i. e.*, intense afferent irritation) upon the respiratory centre, which induces acapnia and shock."

In a series of severe thoracotomies under artificial breathing, shock was not produced; and the normal arterial pressure was maintained for hours, provided the pulmonary ventilation was not excessive. The conclusion "that excessive artificial ventilation can induce a condition closely similar to, if not identical with, that induced by pain" was confirmed by other artificial hyperventilation experiments without any surgical interference; and also by others in which the hyperventilation was obtained by physiological hyperpnea excited by powerful stimulation applied to the exposed sciatic nerves for twenty to thirty minutes. In both instances, the hyperventilation was followed by absolute apnea lasting for eight minutes, when the heart failed for lack of oxygen. To put it briefly, "all the after effects of pain are explicable as due to the acapnia which "the breathing of pain" induces. In an atmosphere of 5 or 6 per cent. CO_2 , torture, though not less painful, would not lead to surgical shock, and certainly not to death by apnea.

"In another series of experiments in which the abdominal viscera were exposed, handled, and aërated, the arterial and the venous blood were analyzed for their gases. It was found that the development of shock fell into two stages. At first, the CO_2 content of the arterial blood diminished gradually, the oxygen content remaining unaltered. During this process the oxygen content of the venous blood steadily diminished, until finally the blood in the large veins was totally deficient in oxygen. When this stage was reached the tissues did not receive enough oxygen to meet their respiratory needs. If irritation of the viscera was stopped prior to this complete venous anoxemia, fatal apnea occurred. After this time fatal apnea was less likely to occur, but the volume of the blood stream appeared to diminish steadily. This, as I have already suggested, I believe to be due to the alteration in the respiration of the tissues, to the development of tissue asphyxia and of acidosis, and to the consequent transudation of the fluid of the

blood into the tissues. I believe that this process is one of imbibition or absorption of water by the colloids of the protoplasm of the tissue cells—a process similar to the swelling of fibrin in dilute acids. The details of this process, however, still require a great deal of work for their complete elucidation.”

THE PRODUCTION OF THE VASCULAR PHENOMENA OF SHOCK BY ACAPNIA. In support of the acapnial theory as explaining the *vascular phenomena* of surgical shock, the lowered arterial pressure of Crile, the venous dilatation, and the hitherto unexplained occurrence of post-operative ileus after abdominal operations, Henderson has shown that the loss of tonus of the abdominal viscera during and after laparotomy is almost certainly due to the direct exhalation of carbon dioxide from the organs during the time of exposure; and that the common practice among surgeons of wrapping viscera in moist hot compresses repeatedly changed is an effective means of producing shock instead of preventing it, as the exhalation of carbon dioxide from the viscera so treated is so great that he can produce experimentally a high grade of shock by this means. Likewise subjecting the viscera, even while still in the abdomen, to a mild current of warm moist air, with practically no trauma, rapidly produces congestion and loss of tonus and motility. This is probably due to an excessive elimination of carbon dioxide from the viscera; for when this gas is restored to the body by injections of saturated solution, intravenously, into the peritoneal cavity, or directly into the lumen of the bowel, or by immersion of the bowel in warm saline solution saturated with carbon dioxide, an effective relief from all except the extreme stages is accomplished.

THE ACAPNIAL THEORY IN ITS RELATION TO RESPIRATORY FAILURE UNDER ANESTHESIA. Anesthesia “raises the threshold,” *i. e.*, lowers the sensitiveness, for CO_2 ; so that the respiratory centre maintains more than the normal CO_2 content in the blood. Coming after the acapnia due to the hyperpnea of some great pain, anesthesia, by relieving the pain and by “raising the threshold,” inevitably leads to apnea. The *prophylactic indication* is to guard the administration of morphine or of chloroform by that of CO_2 . A simple means might be to hold a paper bag over the nose and mouth. “In India, according to Lauder Brunton, it is customary to partly smother a man who has been severely injured.” For the most part, however, the prevention of shock, even if the acapnia hypothesis prove true, will still consist in the prevention of pain.

The Therapy of Moderate Shock is by intravenous infusion of normal saline or of Ringer's solution saturated with CO_2 . “But, after the diminished blood stream has resulted in tissue asphyxia and acidosis, no measure of relief, except perhaps hypertonic saline solution or transfusion of blood, can be of much use.”

In the Acapnial Respiratory Failure of Anesthesia, Volhard's method of supplying oxygen (not less than 400 c.c. per minute) through a soft catheter passed down to the bifurcation succeeds in preventing acidosis during a prolonged apnea, while CO_2 is given time to re-accumulate. It might perhaps be tried in the operating room.

Another method found very successful in dogs is the administration of air or of oxygen (the latter would be more efficient against acidosis), containing not more than 5 or 6 per cent. CO_2 , and to start the breathing by one or two artificial respirations. Henderson has already devised a simple gas meter which may be useful for measuring the small quantities of CO_2 to be added to air or oxygen as a respiratory stimulant. In the future he hopes to be able to persuade clinicians to use tanks of oxygen containing 5 or 6 per cent. of CO_2 .

W. D. Gatch¹ has reported his successful prevention of shock in a series of several hundred anesthetics, by allowing the patients to re-breathe some of their own CO_2 , in confirmation of Henderson's principle that "skilful anesthesia consists in maintaining the threshold of the respiratory centre for carbon dioxide at a nearly normal level, and in avoiding the development of either acapnia or hypercapnia." W. Edwards Schenck² also has practised that method at Cincinnati ever since 1901, with perfect success, on the strength of Waller's demonstrations in 1896 of the stimulating effect of CO_2 upon the peripheral nerves during anesthesia.

THE VASCULAR SYSTEM

Acute Tuberculosis of the Aorta. Endaortitis tuberculosa is obviously a rare affection. P. G. Wooley's case in the *Johns Hopkins Hospital Bulletin* (March, 1911) is the eleventh on record. General miliary tuberculosis had resulted, in this instance, from a chronic renal phthisis, and was not due to aortic dissemination. The morphology of the aortic bacilli was peculiar, and displayed in them a tendency to branching.

Arteriosclerosis. O. Klotz³ closes his research upon the compensatory hyperplasia of the intima, with the conclusion that common influences may act simultaneously upon the media and the intima; and that Mönckeberg's progressive medial degeneration of the peripheral arteries is the coupled result of malnutrition and of muscle fatigue.

E. Metchnikoff⁴ finds that paracresol and indol, so commonly present in the senile, (1) are capable of inducing (in small repeated doses) vascular lesions; (2) that they are not tissue excreta, but products of the permanent microbial flora of the intestine; and (3) that their

¹ Journal American Medical Association, March 5, 1910, p. 775.

² Journal of the American Medical Association, March 4, 1911.

³ Journal of Experimental Medicine, November, 1910.

⁴ Ann. de l'Inst. Pasteur, October, 1910.

successful treatment is the destruction of their producing bacilli by means of the lactic acid bacilli. According to Rudolph, the usefulness of potassium iodide, which Stockman says does not reduce pressure except in huge doses, lies in its eliminating effect upon the toxemia; for which diuretics are also beneficial. We should not forget the work of Abelous and Bain,¹ which has demonstrated the normal presence of "pressor bases" in the urine, and their absence in cases of arteriosclerosis. W. Bain's latest conclusions² as to these pressor bases are as follows: (1) They are apparently first excreted about the age of fourteen. (2) A vegetable diet considerably reduces the amount formed. Eggs and fish reduce it to some extent; but if chicken be taken, it becomes little less than with an ordinary mixed diet containing butcher's meat. (3) The bases are either absent or considerably diminished in cases of high blood pressure; the only possible explanation being that they are retained in the system. (4) In gouty patients with normal blood pressure, the pressor bases are excreted in normal amounts.

Arterial Blood Pressure and its Measurement. HIGH BLOOD PRESSURE is discussed in its connection with arteriosclerosis by R. D. Rudolph,³ of Toronto, who believes in "treatment," particularly that of the toxemia. R. von Jaksch⁴ finds no benefit from high frequency currents for arteriosclerotics, except for the relief of their headache and insomnia.

W. H. Sheldon⁵ looks upon high pressure as a source of "leakage of cardiac energy." Another apt expression (Langdon Brown) is that the patient is perpetually "living close to the limits of his cardiac reserve."

THE INDIVIDUAL FLUCTUATIONS AND PECULIARITIES OF THE BLOOD PRESSURE. These are kindred practical subjects. Zabel⁶ dwells upon the frequency of sudden fluctuations in normal individuals, and of rises due to all kinds of stimulation. Individuality in the nature of the reaction to various agents has been specially dwelt upon by O. K. Williamson. High altitude, static brush discharges, calcium chloride, and many drugs have been described as raising blood pressure. In his own case, they, and likewise taking food, produced only slight effect; tea actually depressed, instead of raising the pressure.

LOW BLOOD PRESSURE has received comparatively little notice. Wilfred Edgecombe⁷ finds, as a result of extensive observations on a normal subject with persistently low pressure, that the raising of a "low pressure" would seem to be a much more difficult matter than the converse. Most cardiac drugs were found ineffectual. Pituitary extract

¹ Lancet, 1909 and 1910.

² Ibid., May 27, 1911.

³ British Medical Journal, November 26, 1910.

⁴ Wien. med. Wochenschrift, No. 44.

⁵ Medical Record, December 31, 1910.

⁶ Münch. med. Wochenschrift, November 1, 1910.

⁷ British Medical Journal, March 11, 1911.

gave an enduring rise of 7 mm. The Vichy douche, and the Naheim aërated bath also gave a permanent rise.

The Treatment of the Low Pressure of Anaphylactic Shock and of peptone intoxication recommended by Pearie and Eisenbrey¹ is: (1) To relieve the splanchnic congestion; (2) to increase the supply to the heart and medulla by combining a pure cardiac stimulant, such as digitoxin, with a slow saline intravenous injection of 1 in 40,000 adrenalin. *Atropine* has a prophylactic action in guinea-pigs, according to J. Auer's² experiments. Without atropine 75 per cent. died; with atropine only 28 per cent. In this connection A. Abrams' remarks³ on the action of atropine in asthma are of interest.

THE TREATMENT OF HIGH PRESSURE BY HIGH FREQUENCY CURRENTS advocated by Ettie Sayer⁴ is commented upon by Samuel Sloan.⁵ The patient must rest before, but especially after, the treatment. A high pulse rate generally indicates a change in the blood pressure from that which is normal to the patient. These currents, when suitably applied, act by lowering the peripheral resistance, and also as a cardiac tonic. If the pressure is low, even moderate doses may depress the heart to a dangerous extent, owing to a further lowering of the pressure; while, on the other hand, small doses may raise the blood pressure by giving tone to the heart. When the pressure is abnormally high from auto-intoxication, these currents act beneficially, probably as a gastro-intestinal tonic and antiseptic; for, as "I have proved, the current from autocondensation passes easily through the alimentary canal."

THE TREATMENT OF ANGINA PECTORIS. Experienced physicians will agree with C. Fiessinger's plan of reducing pulse tension and cardiac excitability by "rest in bed and milk diet." Three of his 20 cases had normal or low arterial pressure. The lesions are sometimes not coronary, but myocardial or aortic. H. W. Verdon,⁶ whose doctor-patient, aged sixty-three years, was in the habit of stopping his attack by deflating the stomach with a tube, suggests that angina may be a "stomach reflex rather than a heart reflex." He also argues from the age incidence of its mortality that, since the mortality declines, from the age of sixty onward, down to zero at eighty, "the incidence of coronary disease on the causation of Heberden's angina is *nil*." This conclusion appears to us too wide for unreserved acceptance.

THE CONFLICTING ARTERIAL PRESSURE READINGS OF THE SPHYGMOMETER AND OF THE SPHYGMOGRAPH are exposed and explained by C. O. Hawthorne in the *Lancet* for February 18, 1911. Concerning the capillaries there is no room for any differences as to the definition of the

¹ Archives of Internal Medicine, August, 1910.

² American Journal of Physiology, September, 1910.

³ Medical Record, November 5, 1910.

⁴ British Medical Journal, 1910, vol. ii, p. 1052.

⁵ Ibid., 1911, vol. i, p. 331.

⁶ Ibid., 1911, vol. i, p. 613.

term "blood pressure;" their blood flows at a constant and uniform pressure. This is "the essential" blood pressure of the body, for the maintenance of its metabolic activities. All other pressures exist with the one aim and object of upholding that uniform and gentle stream. Hence also the mechanisms for converting the varying intracardiac pressures finally into the steady capillary pressure.

Part of the force of each systole is spent in moving the blood along the vessels, part in stretching the elastic arterial walls for their own

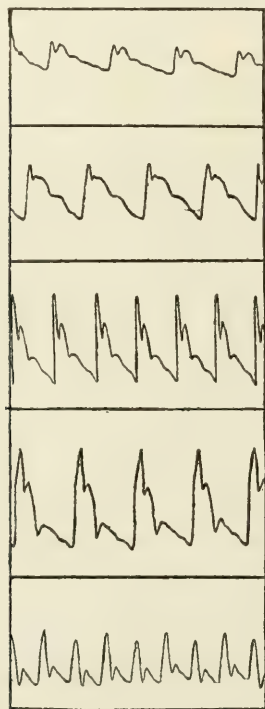


FIG. 3

FIG. 3.—Sphygmograms of different and even of opposite character with, in all, one and the same sphygmomanometer record—viz., 175 mm. Hg.

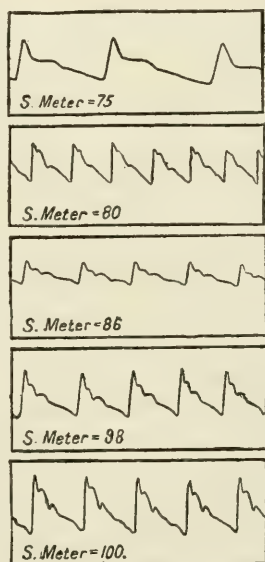


FIG. 4

FIG. 4.—Sphygmograms indicative of "high" blood pressure associated in each case with a "low" sphygmomanometer record.

recoil-pumping action. The arterial walls are placed in a state of strain or tension which never wholly disappears; within them the pressure is always positive. The arterial pressure is a continuous force; but it rises and falls with the cardiac systole and diastole, and these oscillations are greater as the artery is nearer the heart. The figure yielded by the sphygmomanometer is a measure of the force of the left ventricle as this reaches and influences the brachial artery.

As Regards the Peripheral Resistance, since at the moment the record is taken the peripheral circulation in the upper limb is, for the time

being, practically put out of existence by the strangling armlet, the sphygmomanometer cannot measure the contribution this factor makes to the character of the pressure. There can remain for measurement only the contribution made by the left ventricle.

This figure, then, is a measurement of the height to which, for an undefined period of time, the blood pressure rises under the stroke of the left ventricle. In a case of *pulsus alternans*, according to the reading of the *sphygmomanometer*, the patient at one moment may have a pressure of 175, and at the next a pressure of 145; while the conditions have remained unchanged with one exception, that of the force of the systole.

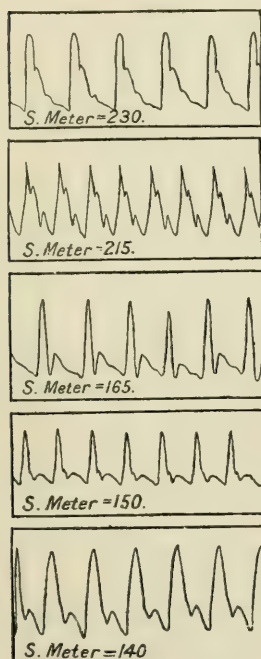


FIG. 5

FIG. 5.—Sphygmograms indicative of “low” blood pressure associated in each case with a “high” sphygmomanometer record.

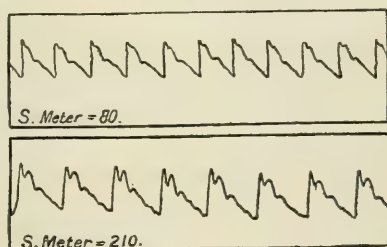


FIG. 6

FIG. 6.—Sphygmograms of similar or identical pattern, with very different sphygmomanometer records.

What, now, are the indications of the *sphygmographic wave* as to the degree of blood pressure? They are found, mainly on its descending line. When this line slopes, with a tidal wave at about the same horizontal level as the primary or percussion wave, and with a diastolic wave high up and relatively inconspicuous, the message is then “high pressure” whereas a quick fall and low tidal and diastolic waves read “low pressure.”

Some of our records seriously disappoint our expectation of a perfect agreement between the sphygmomanometer and the sphygmograph. The contradiction may be absolute, and in both directions. In a given case the sphygmomanometer may intimate a "high" blood pressure and the sphygmograph may protest that the pressure is "low," or *vice versa*. For instance, Fig. 6 shows a group of pulse tracings which in sphygmographic language announces more or less distinctly the existence of "high" blood pressure. Yet in every instance the measurement effected by the sphygmomanometer is a measurement of "low" pressure, the several numbers running 75, 80, 86, 98, 100—that is, distinctly below the normal. Again, in Fig. 5 the pulse tracings indicate a "low" blood pressure; but the sphygmomanometer tells an entirely different story. What is the perplexed clinical instrumentalist to do? Rather than choose between them, shall he fix his faith on his own trusty three fingers on the radial artery? The reasonable and common-sense conclusion is that it is the "claims" and not the instruments which are at fault. The solution of the mystery is that blood pressure, as any other pressure, has other qualities than mere level or height, and that one of these is *continuance* or *duration*.

The sphygmograph, whatever be its other values, certainly does not contribute any reliable information as to the maximum level to which the blood pressure rises; though without doubt its descending line corresponds more or less closely to the movement of pressure decline within the artery. Therefore the terms "high" blood pressure and "low" blood pressure applied to sphygmograms are misleading and inexact. If we agree to replace these terms by the phrases "well-sustained pressure" and "ill-sustained pressure" respectively, all the apparent contradictions and mutual confusions disappear. It must be added, however, that, even when both instruments have been employed, there still exists a deficiency in our record, as neither of them registers the minimum level to which the intra-arterial pressure falls. To measure this so-called diastolic pressure many methods have been suggested, but none of them can be accepted with complete confidence.

IN THE SPHYGMO-OSCILLOMETER invented by V. Pachon, of Paris, and described by Kenneth Eckenstein in the *British Medical Journal*, 1910, vol. ii, p. 1765, the cylindrical aluminum box, the contained aneroid chamber, and the armlet communicate directly with one another by means of a three-way channel, and also with a small manometer with dial which is graduated to centimeters of mercury. The armlet is applied just above the wrist; and the pressure is raised to a point likely to be above the maximal or systolic pressure. The separator key is then depressed. If no deflection of the needle occurs, the pressure is too high, and must be lowered about a centimeter at a time by opening the screw-valve. The maximal pressure is indicated when the needle first shows definite oscillations differentiated from those due to simple

fibrillations or to indefinite pulsations, as in very high blood pressures. As the pressure is gradually lowered, the oscillations increase to a maximal intensity. The number of divisions (from 0 to 20, which are only arbitrary) on the scale over which the large needle swings gives the amplitude of the pulse. The separator key is kept pressed down for a short time, to study the character of the pulse as to irregularity, diastolic, missed beats, and the effects of respiration. Finally, the pressure is still further lessened, until a sudden diminution in the size of the oscillations is observed; the minimal or diastolic blood pressure corresponds to this point.

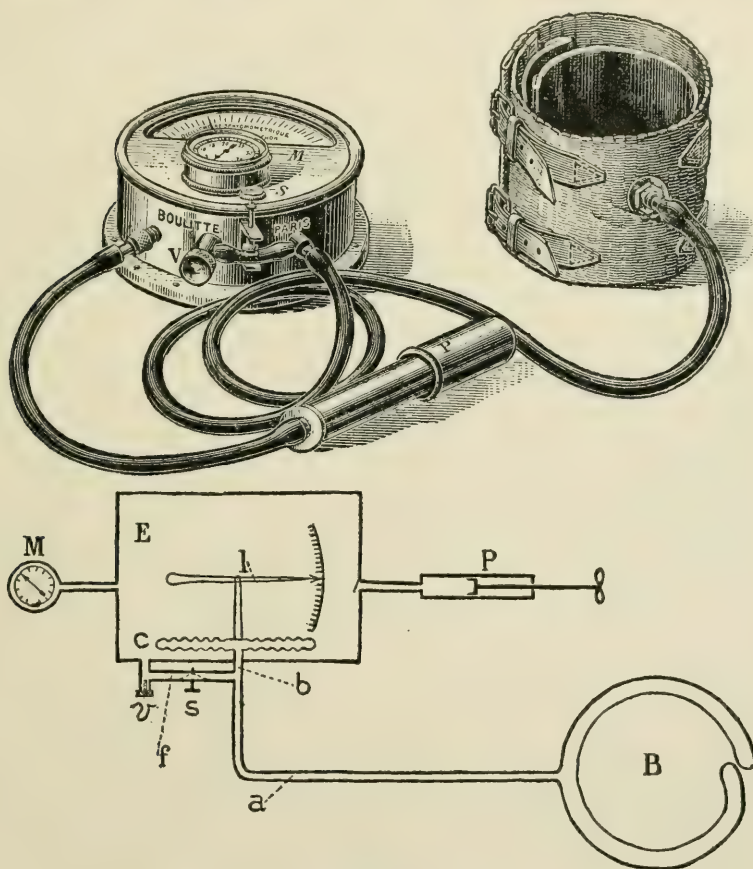


FIG. 7

Thus the sphygmo-oscillometer shows: (1) The maximal or systolic pressure. (2) The minimal or diastolic pressure. (3) The amplitude of the pulse wave. (4) The characters of the pulse wave. This is more information than is supplied by any other instrument. The armlet gives less discomfort than Riva Rocci's; and the procedure is shorter, and is independent of the personal equation.

THE DETERMINATION OF THE DIASTOLIC BLOOD PRESSURE. G. Oliver gave a demonstration before the Royal Society of Medicine (July, 1910) of the value of the auscultatory examination which he has added to his manometer method. H. Ehret,¹ from a series of 1000 cases, considered that his own method by palpation of the ulnar artery is thoroughly reliable and compares favorably with the results obtained with more expensive apparatus either by the auscultatory method, or by von Recklinghausen's method of oscillation.

The Auscultatory Method is in reality simple. It consists in placing the chestpiece over the ulnar artery below the pressure cuff, and in taking the manometer reading at the precise moment when the pressure murmur in the artery disappears during the gradual relaxation of the pressure. The most recent account of Korotkow's "auscultatory method" (1905) is that given by G. C. Gittings.²

The Systolic Pressure can be determined with great nicety to within 1 mm. of mercury, by the cessation of audible throb. This is a much more sensitive reading than that by the finger, which is usually 5 to 10 mm. lower in the estimated pressure. And again the finger usually reads 5 mm. lower for the returning pulsation than when it is obliterated by pressure, an error not given by the stethoscope provided the pressures are worked carefully with due graduation. Oliver thinks that *the diastolic pressure* is rendered more definite. It is obtained by halving the interval during which the throb is heard. Thus, if the range of audibility was between 60 mm. and 110 mm., the diastolic pressure would be 85 mm., viz., 25 mm. below the systolic pressure.

Instead of using a separate stethoscope, Oliver has devised a resonator or sounding box, fitted with ear tubes for two observers. This may be incorporated with the cuff or else buckled separately to the front of the elbow. The observer's hands are thus set free. Another improvement is the suppression of the oscillations of the mercurial column by compressed air.

THE ELECTROCARDIOGRAPH. W. B. James and H. B. Williams,³ and T. E. Satterthwaite⁴ have done good work in demonstrating the great capabilities of the method and in emphasizing its attendant difficulties. Einthoven's machine is eminently comparable to the apparatus of the astronomical observatory well fitted for the votaries of Urania, but ill-suited for amateur use. For the present, at any rate, we may rest satisfied that this wonderful combination of Ader's string galvanometer, of Marey's photographic method, compacted by Edelmann, and further elaborated and utilized by Einthoven, does not enter into the working sphere of ordinary clinical ambitions.

¹ Münch. med. Wochenschrift, January 31, 1911.

² Annals of Internal Medicine, August, 1910, p. 196; Bruno-Fellner, Jr., Weisbaden Cong., 1907.

³ American Journal of the Medical Sciences, November, 1910.

⁴ Medical Record, February 4, 1911.

THE ORTHODIAGRAPH IN CARDIAC DIAGNOSIS. Van Zwaluwenberg and Warren, in the *Archives of International Medicine* for February, report progress to the extent that an abnormal index is an "early" evidence of the increase in size of one or more chambers of the heart. A decrease in the index results from left ventricular hypertrophy and dilatation, and an increase indicates a dilatation of the auricles with or without hypertrophy of the right ventricle. The wide variations in valvular diseases imply useful help for the diagnosis of doubtful or combined lesions.

Venous Blood Pressure and its Measurement. THE CLINICAL STUDY OF VENOUS PRESSURE and of its measurement has almost suddenly sprung into actuality as a clinical topic, thanks to the prominence recently given in clinical cardiology to a proposition advanced by physiologists—that "there is no such thing as *backward pressure*." The perplexity entailed upon the average clinical mind by that statement suggests a little "theory," based upon the graphic method and the manometric, to clear it up.

The *manometric method* establishes the fact that the venous pressure, determined in the "caval system," is the lowest in the entire circulation—the end of a gradual fall from the highest pressure, that of the systole at the mouth of the aorta; and that in the vena cava it oscillates under the influence of inspiration and of expiration below and above zero; these oscillations varying according to the depth of breathing. The "systemic" blood flow and velocity, and therefore also the ventricular intake and output, are dependent upon that normal decline from the maximum aortic pressure to the venous minimum. As the pressure itself is entirely of systolic origin, any progressive systolic enfeeblement would reduce more and more the efficiency of the circulation and affect the ventricular intake and output, until complete standstill would result. Meanwhile the "pulmonary" circulation might be assumed (only for the sake of argument) even to follow suit in that downward working, as a physiologically inseparable partner. The pulmonary question would not therefore arise.

In disease, however, the equality of that functional partnership is often in danger of being lost; the pulmonary question always arises. Hence the futility of any attempt to use the physiological and the pathological observations as exchangeable values. Unfortunately, too, in its pulmonary department, the pathological experiment can only be watched in its "surface" results in the veins. Its workings in the depth of the lung are inaccessible to clinical demonstration.

The *graphic method* has additional extrinsic factors of experimental error. The sphygmograph, for instance, is a modulating instrument, from which the skilled artist can draw at will a bewildering set of variations. Like any musical instrument, it is of no use except to the expert. In order to correctly play on it, we should first learn how to produce all

its artefacts; that we might be trusted to be able to avoid them. Any "tracing," therefore, always calls forth the double question, "What instrument?" and "Who was the artist?"

In spite of these reservations, we must be thankful for the great mercies of skilled sphygmography and phlebography, and to James Mackenzie for the considerable advance we owe to him in the latter. They furnish us with a body of facts available for discussion.

THE BACKWARD VENOUS PRESSURE AND THE CAPILLARY PRESSURE. Although it has been commonly admitted that the rise in pressure might extend from the great veins into their tributaries even as far as the venous radicles, the possibility of its being propagated into the capillaries has been more and more contested of late. Bolton found that, if the venous pressure in the jugular vein were measured a few hours after obstruction had been produced, although the veins were still distended, the pressure in them had fallen to a point that was approximately normal. (See Starling, "The Fluids of the Body," p. 164.) He concludes that there can be no appreciable rise of pressure in the capillaries which are responsible for the increased transudation. Yet this increased transudation and the production of dropsy are proceeding rapidly at a time when the pressures have fallen.

THE CLINICAL DETERMINATION OF VENOUS PRESSURE. The graphic method has until recently been the only one available for a clinical study of venous pressure. All graphic methods (and also the graphic records of clinical or "surface" manometry) suffer from being dependent upon the application of local pressure by the instrument. This introduces an element of doubt. Although the existence of a "backward" accumulation and pressure in heart disease is sufficiently manifest, it has not therefore until recently been afforded mathematical demonstration by the manometric method.

The "*Phlebotoonometer*" constructed by F. Moritz and D. von Tabora¹ consists of a water manometer placed in direct communication with the venous blood. For this purpose a hollow needle provided with a special stopcock is inserted into the median vein and connected with the manometer. The observation has to be made at rest in the horizontal posture, and after previously establishing, with a special graduated rule, a true level between the puncture and the centre of the right auricle. Carried out in this fashion, the method enables us to determine the median values of the venous pressure oscillations, but not their extreme maximum and minimum values.

The normal medium pressure was found to be, on the average, about 52 mm. of water. Pressures of 80 to 90 mm. are to be regarded with some suspicion, and any pressure above 100 mm. as indicating some abnormal circulatory condition. Any compression of the thorax takes con-

¹ Deut. Archiv f. klin. Med., 1909, 1910, Band xlviii, S. 475.

siderable effect upon the venous pressure. The forcible expiration of cough, for instance, will drive it up momentarily to 370 mm.; and Valsalva's experiment up to 420 mm. But these are purely temporary, experimental variations.

The highest sustained venous pressure recorded by v. Tabora in cardiac failure was 320 mm. of water, but it is common to find a pressure of 200 to 250 mm. in cases of enfeebled circulation. These permanent high pressures will be seen to be the result of the circulatory exhaustion, as described in a second paper by v. Tabora,¹ which is entirely devoted to the clinical purpose. The pressure is due to a want of proportion between the "load and the lift" at the "dead point" in the circulation; and he uses the instrument to decide how this should be remedied. It is more to be regretted that the postural clause should preclude its employment in the most important section of the clinical field. The cardiopaths who stand in worst need of venesection are those least able to lie flat.

THE HEART AND ITS AFFECTIONS

The Commoner Types of Functional Cardiac Murmurs. In his thoughtful paper read before the American Academy of Medicine, W. S. Thayer² finds it difficult to explain why, at certain points in the heart, murmurs *are not always present* in the normal individual. Of the functional murmurs which are so constant in their character as to be immediately recognizable, there are at least three varieties.

1. The basic, commonly called "pulmonary," systolic murmurs. These murmurs, which are apt to disappear in the erect posture, are greatly intensified by deep expiration, and diminished or even extinguished by full inspiration.

2. The systolic murmurs limited to, or heard with great intensity at the apex, but audible only in the recumbent posture. These are very common in healthy young men and women, perhaps more so in nervous or thin, emotional people; but they are often found in robust youths or girls. They may be heard all over the cardiac area; sometimes they are loudest in the pulmonary area. In the erect posture, however, they clear up at the apex, leaving only the pulmonary systolic, which, as stated, disappears on inspiration.

3. The cardiorespiratory murmurs. They are commonly systolic in time, but rather late, occurring after a clear-cut first sound.

Their peculiarity is that they are limited to one phase of the respiration, disappearing, as a rule, when the breath is held. In the common variety, heard with the several beats occurring during inspiration,

¹ Münch. med. Wochenschrift, June, 1910, No. 24.

² The Medical Magazine, December, 1910, vol. xix, p. 740.

careful attention reveals that the murmur is simply an intensification of the respiratory murmur, and is sharply limited to the period of ventricular systole. They are often more intense on effort with rapid forcible cardiac action, and on deep breathing. It is specially to be noted that *these are often heard with great intensity in the back*.

This variety is not, however, restricted to the respiratory phase; they may be audible during expiration, and sometimes when the breath is held. A cardiac respiratory murmur may be told from the endocardial murmur by its timbre, and its superficial, soft, rustling character, and by its *accompanying rather than modifying* the cardiac sound. Of this kind is the postsystolic whiff during the heat excitement after vigorous exercise.

In addition to these three more definite types, there are others apt to occur in healthy individuals. Again, there are instances in which systolic functional murmurs at the apex are present in the erect posture alone, and absent in the recumbent posture.

This condition on which Potain insists is, in Thayer's experience, rare. In general, however, it may be said with considerable assurance that heart murmurs, limited to a single phase of the respiration, or heard in one position of the body alone, are, in the great majority of cases, quite devoid of pathological significance.

As regards the functional murmurs which arise in subjects suffering from definite cardiac conditions, Thayer prefers to consider them separately.

1. MURMURS ASSOCIATED WITH ANEMIAS of all sorts: (a) Basic soft systolic murmurs, over both valves, or more commonly at the pulmonary than at the aortic site. The pulse is often large and soft, and the arteries throb visibly. (b) Systolic murmurs at the mitral and tricuspid orifices. These murmurs also are soft and blowing, sometimes, however, largely replacing the first sound. They are not infrequently transmitted to the axilla or even to the back; the second pulmonic sound may be somewhat accentuated, while commonly the heart is slightly large.

2. SYSTOLIC APICAL MURMURS OCCURRING ESPECIALLY IN THE COURSE OF AN ACUTE INFECTIOUS DISEASE (acute rheumatism and typhoid fever particularly), where, however, there may be relatively little anemia. In these patients the first sound is usually dulled, and may be wholly replaced by the murmur. Here, again, there is generally a slight cardiac enlargement; the murmur may be transmitted to the axilla and the second pulmonic sound may be slightly accentuated.

The apex systolic murmurs of exophthalmic goitre, where there is generally a distinct cardiac enlargement, are probably the result of true insufficiency of the mitral ring, due to dilatation.

TRANSIENT AORTIC AND PULMONARY INSUFFICIENCIES are, Thayer assures us, of real occurrence. Aortic insufficiency of muscular origin, with characteristic murmur and pulse and slight cardiac enlargement,

was observed by him in two cases of typhoid, disappearing with convalescence; and likewise in two remarkable cases of exophthalmic goitre which he relates.

"The observations of Hugh A. Stewart have proved the importance of the part played by the ring of muscle below the aortic valve in the closure of the orifice. And just as Stewart has been able to produce an aortic insufficiency by mechanical injury to this ring of muscle without lesion of the valves, so in some cases it is but natural that a weak and diseased heart muscle should result in aortic as well as mitral insufficiency.

ORIFICIAL PULMONARY INSUFFICIENCY INDEPENDENT OF VALVULAR DEFECT. Thayer believes in its frequency as the cause of a soft diastolic murmur heard along the left sternal margin, in much the same area as that occupied by the murmur of aortic insufficiency. It is met with, as Graham Steell has pointed out, in connection with dilatation of the right ventricle, usually following old mitral disease. It may be suspected when there is absence of signs of aortic disease (character of the pulse and of the second aortic sound at the base and in the carotids), and in the presence of dilatation of the right ventricle, and of a possible disappearance of the murmur, with improvement in the condition. Its association with dilatation of the pulmonic orifice, in the absence of aortic changes, has been proved frequently by necropsies. The pathological changes in the heart muscle may improve and sometimes recover, as in some cases of exophthalmic goitre, or after acute infections.

THE COMMONER TRULY FUNCTIONAL MURMURS are: (1) The basic "pulmonary" systolic murmurs. (2) The apical systolic murmurs, disappearing in the erect posture. (3) The cardiorespiratory murmurs.

1. *The basic systolic murmurs* over the conus, or pulmonary artery, have various possibilities. Thayer and McCallum¹ have observed that in dogs it is easy to produce a systolic murmur just beyond the pulmonic ring, by hemorrhage. The excursions of the pulmonary artery were generally very large. The vessel was relaxed or the volume of each systole was large; as also when, after hemorrhage, salt solution had been infused. The ventricular action too appeared to be rather abrupt. Now, in anemia in general there is rather low blood pressure, with diminished specific gravity and viscosity. Moreover, the blood flow per minute is greatly increased, and the systolic charge is larger than normal. The conditions then might postulate for the production of basic systolic murmurs.

Their position to the left side of the sternum, and in the third space, rather below the pulmonary orifice, and the fact that they are increased

¹ Experimental Studies on Cardiac Murmurs, American Journal of the Medical Sciences, 1907, vol. cxxxiii, p. 249.

or induced by expiration, and diminished or obliterated by inspiration, suggest, however, another explanation. In dogs with an exposed heart it is easy to produce a murmur and thrill beyond the conus, by very light pressure of the stethoscope on it. Such pressure results in a thrill and murmur beyond this point. May not then the pressure exerted by the chest wall be sufficient to occasion such a murmur? Inspiration removes the pressure, and the murmur ceases. Again, with age and increased volume of the lungs the murmur is less frequent. Janeway,¹ referring to the frequency of expiratory systolic murmurs at the base, has suggested that they are due to pressure.

2. The *cardiorespiratory, inspiratory systolic murmurs* are obviously due to the accentuation of inspiration, and exercise may and often does exaggerate this phenomenon.

3. As to the cause of the *systolic apical murmurs* heard in the recumbent and left lateral posture, Thayer agrees with Henschen,² and has always regarded them as due to a true mitral insufficiency, dependent on position alone, and therefore as a normal phenomenon.

Their Frequency. How frequent are these three sets of functional murmurs? The basic systolic murmurs are extremely common, and it might be possible to produce them by forced expiration in a number of individuals. The cardiorespiratory murmurs, of the kind described, are not rare, but by no means as frequent as the last-mentioned class.

As to the frequency of apical systolic murmurs, last year Thayer examined a large number of healthy young people in connection with "the third heart sound." In all these special note was made as to systolic murmurs disappearing in the erect posture. Of 218 cases in the first four decades of life, 73, or about one-third, had them at the apex in the recumbent posture. As a rule, they were heard all over the cardiac area, but loudest at the base in the pulmonary area.

In conclusion, Thayer urges:

1. That a cardiac murmur is but one, and sometimes an unimportant link in the evidence of disease of the heart.

2. That cardiac murmurs are present normally in many healthy young people.

3. That the commoner forms of these murmurs are those he has described.

4. That these truly functional murmurs should be carefully distinguished from those which may arise at various orifices without valve disease, as a result of pathological changes in the heart muscle or in the blood.

5. That a familiarity with the functional cardiac murmurs is at least as important as an acquaintance with the organic.

¹ Transactions of American Physicians, Philadelphia, 1906, vol. xxi, p. 61.

² XVI Cong. internat. de med., Budapest, 1909, vol. vi, Fasc. 1, p. 221.

THE CARDIAC DIASTOLIC SOUND AND IMPULSE are commented upon by Theodore Fisher¹ as follows: "It was evident that, in many of the children in which a presystolic murmur had been heard, no organic disease was present. In these cases the so-called "presystolic murmur" no doubt had been a diastolic sound which had disappeared."

"The presence of a well-marked diastolic sound audible over the heart toward the end of some cases of typhoid fever and its disappearance during convalescence are well known. But during ailments of slighter character this sound, although not uncommonly present, may not so often attract attention. An ill-defined febrile attack of a few days' duration may, in a child, be quite sufficient to lead to the appearance of the sound. It is frequently heard in comparatively chronic conditions of ill-health, such as dyspepsia or anemia."

"When a diastolic sound is well marked, a diastolic impulse is also present which can be felt by the hand placed over the heart. A tracing of such an impulse can be taken with a cardiograph or with Dudgeon's sphygmograph. The pressure employed, however, should be slight. Under too great a pressure the wave due to the diastolic impulse does not appear on the tracing. The ease with which the wave may be obliterated causes its impulse to be felt much more easily by the hand than it is recorded by a tracing."

"Although a diastolic sound is commonly present in association with temporary ill-health, in which the heart probably suffers, it is perhaps most marked in cases of organic disease; but in those cases the sound may be strangely inconstant. It may be distinctly audible one hour and not the next. The character of the impulse and the character of a cardiographic tracing, as might be expected, change with the alteration of the sounds."

"When the sound is best heard at the apex it probably arises in the left ventricle. When more widely heard, it may arise in both ventricles or in the right only. Over the right ventricle, as at the apex, the distinctness with which it is audible varies from time to time. Over the right ventricle the diastolic sound is not uncommonly best heard, and sometimes heard only at the moment that expiration ceases and inspiration begins. This is the moment at which an intermission of the pulse is frequently noted to occur in children."

"Another fact is the occurrence of a diastolic sound in association with hypertrophy of the heart. The presence of the sound in the large heart of Bright's disease has frequently been the subject of comment. Another variety is the hypertrophy associated with adherent pericardium in children. Here the sound may sometimes be so prolonged as to be readily mistaken for a presystolic murmur."

Heart Failure. James MacKenzie's² Oliver-Sharpey Lectures tell us more about the clinical history of heart failure than about its etiology

¹ Lancet 1911, vol. i, p. 11.

² Ibid., pp. 911 and 985.

and mechanism. In analyzing the popular "present day conception" of the condition he has no difficulty in tracing it back to the exaggerated morbid significance attached to the valvular murmurs, and to the mechanical impairments to which they are attributed. But he asks, "Are murmurs necessarily a sign of impairment?" Frequently they are not. He refers to the various means by which the shortening of a flap may be compensated for by adaptations of the orificial muscular contraction, and of the ventricular tone. Wilkinson King's "safety valve action" of the tricuspid, and the "physiological dilatations" of which the heart chambers are capable are instances in point. The more recent pathological fact in this connection is that the circulation may be maintained in spite of the auricular systole failing to take place, and of its being replaced by the condition described by H. Lewis as "fibrillation."

THE HARMLESSNESS OF IRREGULARITIES is still more frequent than that of murmurs. So far from their being conclusive evidence of disease or infirmity, they may within certain limits be regarded as positive evidence of a healthy heart. Their common causation is a premature contraction of auricle or ventricle which may be too small to be felt at the wrist, but does not entail any grave consequences and requires no treatment.

THE "BACK PRESSURE" THEORY is another illustration of the fascination attaching for teachers and pupils to simple mechanical explanations for the most complex vital adaptations. Although it may be present and may modify the symptoms, the back pressure is "never the essential cause" of heart failure.

AURICULAR FIBRILLATION is to be regarded as "the greatest discovery" of practical importance in our clinical pathology of the heart. It is accountable for the results hitherto attributed by the back pressure theory to mere distention of the auricles. Its precise mode of origin is not described by Mackenzie. Its effect is to supersede the normal systole of the chamber. Its extension to the "ventricle" might, according to MacWilliam, be the probable explanation of sudden death. Mackenzie states that the fibrillation cannot be passed along the bundle of His, but merely throws upon it a multiplicity of disturbing stimuli. The result is ventricular irregularity, with increased or diminished frequency, according to the individual susceptibility of the bundle or of the ventricle.

Its sudden advent, due to previous insidious changes, throws all four chambers into abnormal action. It explains the sudden inception of an altered rhythm in *various degrees* of heart failure, some with little or no impairment of the heart's efficiency, but preëminently in severe cases. He estimates at 70 per cent. the frequency of this causation for the onset of dyspnea and dropsy.

TO ESTIMATE HEART FAILURE and the significance of its symptoms Mackenzie distinguishes between the "rest-force and the work-force" of the heart. Failure begins in a loss of proportion between the exhaustion and the restoration of the work-force—practically an inadequacy of rest. This calls into play the protective mechanism, which for every organ consists in the ancillary functional activity of other systems. Thus exhaustion of a healthy heart will produce symptoms identical with those of a diseased heart; and these are at first subjective discomfort or distress. In failure the objective symptoms of dilatation and dropsy may never occur, but they are always late manifestations. If they should persist when the body is kept at rest, the inference is that the work-force has been wholly expended, and that in turn the rest-force also is being exhausted.

THE RATIONAL TESTING FOR EFFICIENCY, or for "muscle failure," is by observing how the heart responds to effort. But this is not taught; nor is the test exacted by the schedules for insurance. Elaborate blood pressure instruments, graphic records, even the electrocardiograph, can give but little evidence as to cardiac integrity and capacity. Mackenzie begins by inquiring into all the subjective sensations which arise in the patient under stress of daily work or play, and which are often apt to be ignored by him. Happily these are frequently nothing worse than harmless extrasystoles. *Pain* is a much more telling utterance from the protective mechanisms. In angina, the past history almost invariably reveals long antecedent subjective warnings, which had been disregarded and had not secured for the heart the full rest which they should have claimed for it. On the other hand, there are those in whom careful inquiry will reveal that much of the distress was due to accidental embarrassment, as, for instance, from an overloaded stomach.

THE ACTUAL TESTING FOR RESPONSE TO EFFORT has its limitations which every practitioner will recognize; but in principle it is the most effectual means of discriminating between the structural and the merely functional failure.

THE TREATMENT is, above all, by rest—increased rest from labor and increased diastolic rest by digitalis. The vast majority of patients in whom digitalis acts with marvellous slowing effect are those with auricular fibrillation. Hearts with the normal rhythm are seldom so sensitive to its action. A great deal of the reputation of vaunted remedies, such as baths and exercises, and various drugs, is due to the fact that rest was also prescribed, and also to the fact that the real condition neither indicated heart failure in the present nor its likelihood in the future. As regards strychnine, "there is no reliable evidence" that its medicinal doses have the slightest effect upon the heart.

One of the most striking features in Mackenzie's exposition is the large place which he has made for auricular fibrillation in the direct production of heart failures not only of the severe type, but of minor

degree; while too little light is forthcoming as to the mechanism of its origin. His criticism of some of the remedies now in vogue may be regarded as a "challenge thrown down to a large school of practitioners" which can hardly fail to be taken up.

Loss of Compensation. Remarks on its Mechanism and Treatment. THE EVIDENCE OF BACKWARD VENOUS PRESSURE IN CARDIAC INADEQUACY. Whether by eye, finger, or lever, clinical evidence is to be got of a fulness and of a pressure in the jugular veins and others, whenever the circulation is delayed by inadequacy of the heart pump to its work. As may be gathered from Starling's¹ lucid description that work consists, for the left ventricle, in setting up in the systemic blood column, which is confined within an elastic container under a given pressure, the utmost difference between the pressures prevailing at its two extremities.

THE "MEAN SYSTEMIC PRESSURE." If that distributing force should fail altogether, the column will cease to move, since one and the same pressure, the "mean systemic pressure" (which in the dog has been shown to be equal to about 10 mm. of mercury), will then prevail at both its ends and throughout its entire length. If, however, that force should be merely diminished, then the flow will be retarded, in proportion as the aortic pressure will have sunk and the venous fulness and pressure will have risen toward that mean pressure of 10 mm. of mercury.

In the normal working that 10 mm. pressure will figure only as one of the successive degrees in the descending scale from the aortic pressure to that of the vena cava. It will have its seat at one particular level in the vascular system. Its locality has been found by Bayliss and Starling² to correspond to the region of the hepatic capillaries in the abdomen, and to about the level of Poupart's ligament in the femoral vein. It is from this normal "turning point of the systemic circulation" (the situation of which would be somewhat different in man owing to his erect posture), that with diminished pumping the 10 mm. pressure would spread in both directions, owing to the fall in the arterial and to the rise in the venous pressure. They conclude from this that "failure of the heart's action can only bring about a fall of pressure in the capillaries of the intestines and peripheral parts of the body"—apart from the modifying influence of arteriolar constriction into which we shall not enter.

THE PULMONARY CIRCULATION. So much for the "systemic" pressure. Similar reasonings would apply to the *pulmonary* circulation. The important point to remember is that, in pathological states, the working adequacy of the right heart is apt to fail before that of the left heart. The transpulmonary flow being retarded, some of the blood

¹ Loc. cit.

² Loc. cit., p. 166.

is delayed, accumulates in the great veins, and sets up within them corresponding pressure. In short, the great veins are apt to be overcharged for pulmonary reasons as well as systemic, but chiefly owing to the former if the cardiac weakness should be greater on the right side than on the left. The essential conclusion is that, while perfect cardiac adequacy is characterized by relative emptiness and by low pressure in the great veins, considerable rise in their fulness and in their pressure is the inevitable result of cardiac inadequacy. The only possible liquidation for this situation is by baling out the blood accumulated in the veins and in the lung, and thus "lightening the load" down to the lessened power of the right ventricle.

Failure of the Circulation may result, however, independently of the heart and without any loss of its adequacy, namely from a relaxation of the tone of the bloodvessels, and a corresponding depression of the mean intravascular pressure. In the result this amounts to a relative emptying of the vessels; and resembles, therefore, the condition produced by profuse hemorrhage. This was referred to in connection with the subject of "Shock" and of "Edema." Meanwhile these elementary data will suffice for our immediate purpose.

NATURE'S METHOD OF COMPENSATION FOR VENOUS OBSTRUCTION are found to differ materially according as the obstruction is due to the gradual weakening of the heart from disease, or to the experimental constriction of the great veins by ligature in an animal with a sound heart, as in Charles Bolton's remarkable experiments. Dropsy finally occurs in both instances, but much earlier in the latter. In disease, it is preceded by a much longer phase of preliminary compensation by progressive backward pressure and blood storage, as a means of delaying the dropsy.

DROPSY, BY CAPILLARY DYSTROPHY. The leakage through the capillary wall has been shown by Cohnheim, by Lazarus Barlow, and others, to be due to the malnutrition and degeneracy of the membrane, rather than to filtration through it by excessive pressure. That this is the mechanism of dropsy has been conclusively shown by Bolton's¹ experiments. Starling says² with reference to them: "On completely ligaturing the superior cava and constricting the inferior cava to a diameter of 3 mm. the arterial pressure fell considerably, while the venous pressure rose. In a few hours the venous pressures, taken in the peripheral ends of the jugular and femoral veins, often fell to normal. In every case, however, dropsy was produced, fluid being found a few days later in each pleural cavity, in the peritoneal cavity, and in the mediastinum. It is especially important to note that the dropsy was produced at a time when the venous pressures had fallen to normal."

¹ Proceedings of the Royal Society, 1907, vol. lxxix, p. 267.

² Loc. cit., p. 169.

LOWERING OF CARDIAC ACTION BY VENOUS ACCUMULATION. In both instances the retardation of the blood leads to a depression of the aortic and arterial pressure; and, in the physiological experiments, this quickly tends to check the venous accumulation itself, the sound heart making the best of the altered circulatory conditions. But the obstruction from disease is so gradual in its progress that time is allowed for an infinity of adaptive changes in the heart, in the vessels, and in the tissues, which are quite incapable of registration. They are all connected with a steadily increasing engorgement in the rear of the heart. Starling¹ dwells upon this complexity of the pathological problem, and makes special reference to the hindrance to the outflow of lymph into the vena cava, and to the probably great increase of lymph outflow from the congested liver, as contributory factors in the production of ascites.

LOSS OF COMPENSATION IN MITRAL DISEASE, AND ITS PULMONARY TREATMENT. Mitral disease, as responsible for most cases, best illustrates the progress of cardiac inadequacy. Almost invariably it is a pulmonary complication, commonly a bronchial attack, which upsets the fine balance of the pulmonary circulation, as a last straw added to the burden of the right heart.

The bronchitis is both cause and effect: a "congestive bronchitis" itself, based upon a "passive bronchial congestion." In the long clinical diary of the case many minor congestive stresses had gone before, for which the right heart had been able to find a compensation in its temporary dilatations, and in the increasing permanent dilatation of its tributary veins. The steady tendency had been to increase the charge and the capacity of the "venous reservoir in the rear," and by systolic inadequacy of the overloaded right heart to increase the charge and the capacity of the "pulmonary reservoir *à fronte*," thus rendering the systolic charge of the left ventricle a precarious and fluctuating quantity, as shown in the typical variations of the "mitral pulse," and unduly sensitive to the respiratory alternations of blood acceleration and of delay.

This is the *substratum* which turns a trivial bronchitis into a massive pulmonary congestion, invincible alike for the dilated right heart with "fibrillating" auricle, and for the left ventricle starved of coronary blood and of oxygen by the *prostration of the respiratory function*.

The Key to the Situation is in the Lung, and there also is the key to the treatment. An adequately large venesection is the quickest way to bale out the pulmonary reservoir, and thus to restore the pulmonary space to ventilation. The less rapid, but less artificial and heroic fulfilment of the causal indication is (in the absence of acute or mechanical bronchial obstruction) to *restore the respiratory function*, as a means of liquidating the pulmonary congestion, of easing the right heart,

¹ Loc. cit., p. 171.

and of strengthening the left. Oxygen inhalation may help the left heart slightly; but it is unable to relieve the right; for it does not promote respiratory movement, which is the more gradual mechanical remedy for the pulmonary congestion. Apart from bleeding, the rational remedy (where there are no contraindications) is to treat the left heart by complete rest, and the right heart by stimulating the respiratory function.

The Respiratory Treatment. These considerations prompted me, before the end of the last century, to give systematic CO_2 inhalations as the "earliest instalment of cardiac treatment" in broken compensation. My reply to critics who had not witnessed their beneficial effect was: "I administer CO_2 in the dyspnea of cardiac patients in order to supply them with the oxygen they need." The clinical result is (1) an immediate relief of the subjective distress of breathing, and also of any anginoid pain; (2) an immediate increase in the range of the respiratory movements; and (3) a rapid improvement in the size and tension of the pulse, such as might be expected from the improved blood supply to the left heart, and from a better aëration of the blood.

The "Prebalnear Treatment" by CO_2 . I had realized that the undoubted efficacy of the Nauheim bath resided much more in the CO_2 inhaled from it than in the stimulation of the cutaneous circulation by its gas bubbles and by its salts; and that "respiratory treatment" was much more needed at the worst stage of the cardiac disablement, as the main indication of the hour, than when, by prolonged rest and other treatment, the patient had become fit to be moved and bathed. Hence the title "Prebalnear Treatment" attached to the brief description of the method which was communicated to the Portsmouth Meeting of the British Medical Association in 1899.¹ I little suspected at that time that the "arterial pressor effect" of CO_2 , which I attributed to a rehabilitation of the pulmonary circulation, might be largely due to a *venous pressor effect*, as we are now taught by Yandell Henderson to assume.

Since then the rationale of the respiratory method of relief, based upon Mosso's theory of acapnia (1897), has become a familiar chapter in physiology. This is not the place to dwell upon the remarkable advances due to the researches of Haldane and of his co-workers. Henceforth, on that safe foundation, it is capable of many future therapeutic developments with an improving technique. Leonard Hill's experiment of "breathing in and out through a wide tube" supplies a ready demonstration. But the method *secundum artem* is the original one of inhaling small percentages of CO_2 from an absolutely pure supply, free from all traces of CO, in small cylinders such as I have used.

¹ The Prebalnear Treatment of Heart Disease by Inhalations of Carbonic Acid Gas; and on the Use of the Inhalations in Cardiac Dyspnea and Anginoid Pain, British Medical Journal, 1899, vol. ii, p. 1178.

The next movement in the clinical method will probably be to associate, as in my cases of leukocythemia, with the CO_2 the inhalation of oxygen instead of air. It may be possible to devise, as suggested by Yandell Henderson for the treatment of shock, accurately measured supplies of the joint gases in definite proportions. In this way the oxygen indication for the left ventricle may be combined from the first with the respiratory indication for the right. I may be able to submit to this year's Annual Meeting of the British Medical Association, at Birmingham, a simple clinical method for that purpose.

Heart Diagnosis, Methods and Tests. ABDOMINAL INACTIVITY IN PERICARDITIS. This peculiarity—it may perhaps not yet be registered as “a sign”—has been observed by Essex Wynter¹ in a series of cases of pericarditis with one exception only, as an involuntary inhibition of the action of the diaphragm. This is a result not unlikely to attach to a painful affection, and is already familiar to clinicians in diaphragmatic pleurisy. Its occurrence was confirmed by the experience of other observers, but not as a constant phenomenon. Wynter finds that it may precede and outlast other signs. This limitation of abdominal movement, with “expiratory” fixation, is more marked in the fibrinous variety, less obvious in effusion, and absent in simple adhesion.

AS A SIGN OF PERICARDIAL EFFUSION we cannot agree with Professor Hirtz that the *genupectoral posture* is quite pathognomonic. In small children, that posture is not uncommonly assumed for sleep in various forms of dyspnea, chiefly cardiac and pulmonary, to favor respiration.

POSTURE IN CARDIAC AFFECTIONS. This is a well-worn subject which never fails to appeal to the practical sense of the clinician and to the mechanical conceptions of the heart specialist. The merits of the inclined plane in the treatment of dropsy and of visceral displacements are ancient history; but they are profitably reviewed by H. W. Berg, in the *Medical Record* for April 8, 1911. As regards the heart itself, the results of expert percussion have been amply confirmed by orthodiagraphy. P. C. Franze, of Nauheim, and others have demonstrated the well-known facts that in the erect posture the shadow of the heart is narrowed and lowered, and that in recumbency it is broadened and raised; and, moreover, that independently of posture similar changes tend to result from the inspiratory descent and the expiratory ascent of the diaphragm. The audibility of heart sounds and murmurs, as well as the intensity of their production, are also influenced.

W. Gordon,² of Exeter, gives references to his previous contributions to the study of “Posture and Heart Murmurs,” 1902, of “Cancer and Tumors of the Stomach,” 1902, and to his subsequent publications. His present paper is written to show that there is no such thing as the “cardiosplanchnic phenomenon” of Albert Abrams,³ and that the state-

¹ British Medical Journal, 1911, vol. i, p. 255.

² Ibid., p. 684.

³ American Journal of the Medical Sciences, 1904, p. 125.

ment that the lower sternal region is resonant in the standing posture and dull in the recumbent is contrary to fact, as the effect of the supine decubitus is to cause the heart to "drop back," which Abrams denies, although Rudolf, of Toronto, has given skiagraphic proof of that alteration. The argument is complicated by the fact that Abrams relies mainly upon the sense of "resistance" in palpatory percussion, and Gordon mainly upon the percussion sounds. In reality, the whole question is complex. The gravitation of the heart as one, and that of the splanchnic blood flow as another result of recumbency are both true facts; but the range of their operation is apt to be immensely varied by collateral factors from case to case. Throw in the not less marked variability in the methods and in the skill of the observers; it becomes obvious that the discussion of results gathered at some interval of distance, and not capable of mutual estimation and endorsement, is not likely to be brought to any satisfactory conclusion. Much finer methods, and opportunities for joint observation, such as those afforded by the electrocardiograph and the orthodiagraph are necessary as a basis for the appraisal and the correct interpretation of the considerable individual variations which these instruments will reveal.

Cardiac diagnosis is shown by V. von Jagi¹ to be largely attainable by simple physical examination by various methods and in particular by means of Moritz's percussion stroke of medium force, or by Goldscheider and Sahli's minimal and perpendicular stroke. It is in the nature of things, however, that the left border of the heart, if much displaced outward, should be difficult to define with strict accuracy either by the latter or by the x-rays.

KILLIAN'S THREAD TEST is likely to be useful in the diagnosis of the reflex nasal neuroses which are increasingly frequent in town dwellers. A fine thread (No. 100) is made to project about 7 mm. beyond the tip of a fine sound, in order to localize the point of maximum sensitiveness, usually "far back" on the septum (Rosenberg), or on the inferior turbinal (Hartmann). The sphenopalatine neuroses are apt to involve the respiration and heart action. Stimulation of a "heart point," backward and high up on the septum, slowed the heart beat and made it irregular in Koblanck's experiments on dogs; and clinical experience is confirming this observation.

THE PHARMACODIAGNOSIS OF CARDIAC DISEASES, by A. Abrams should be read in the *Archives of Diagnosis* for October. We can merely note some of the main points. The *heart's reflex* is exaggerated by pilocarpine ($\frac{1}{10}$ grain) and abolished by the full action of atropine, which paralyzes the motor ends of the vagus. *Heart block* (Adams Stokes) is removed by atropine in its "neurogenic" forms, but not in its myogenic production *via* the bundle of His. In *tachycardia*, if aconite should

¹ Wien. med. Klin., November 27, 1910.

exert its normal slowing effect upon the vagus, this points to a diminished tonic activity of the vagus as the morbid causation. But if, between paroxysms, atropine should not excite an attack, the causation is probably not through vagus paralysis. *Arrhythmia* may be likewise tested as to a neurogenic origin by atropine. When the original irritation is trigeminal in the nasal mucosa, cocaine applied to the latter will suppress the arrhythmia evolved by probing. In *myocardial affections* the diuretic action of a reliable digitalis preparation may be used as a quantitative test for cardiac muscular efficiency. In *cardiac asthma* the diagnosis from bronchial asthma is given by the efficiency of cardiotonic medication, or of concussion of the seventh cervical spine. Amyl nitrite suppresses the rales due to simple bronchial spasm, but not those caused by mucus or edema. *Ventricular dilatation* is to be distinguished from effusion by the heart reflex. *Angina pectoris*, if true, is not relieved by sufficient doses of antipyrin, but may be aggravated by the vasoconstricting effect. In *thyroid heart* diagnosis, thyroid secretion, which has been stated to be the source of the normal tone of the vagus, antithyroidin or Beebe's antiserum, and iodothylin or iodine will help to distinguish between hyperthyroidism and hypothyroidism. For *cardiac murmurs*, the effect of digitalis and of various other vagus stimulations often provides the diagnosis between an organic and a functional derivation.

STETHOSCOPE AUSCULTATION has been used by A. E. Garrod¹ for the diagnosis of articular affections, even in the smaller joints; but its discriminating power is not great, and will not, for instance, identify the gouty nature of an arthritis. The noises are apt to be loudest when the lesions are least advanced, as in incipient osteo-arthritis. Noiseless joints are by no means always healthy, as in the case of fluid. Tuberculous joints are frequently silent, as also the acute stages of osteo-arthritis, though in the latter a "synovial crackle" may indicate that the morbid process is periarticular. An osteo-arthritic "scrunch" is characteristic of fibrillation of cartilage and formation of osteophytes. A friction sound may be heard with eburation of bone and in inflammation of tendon sheaths.

VISIBLE PULSATION OF THE TONGUE IN AORTIC VALVULAR INSUFFICIENCY. This symptom has been frequently observed by L. Minervini² in pronounced aortic regurgitation; and as he has not met with it in any other valvular affection, he regards it as distinctive of the condition. The pulsation is conveyed by the lingual arteries. It is most marked in advanced cases with hypertrophy and dilatation of the left ventricle. It is best seen when the patient sits up with the head slightly thrown back and with the tongue resting on the floor of the mouth.

¹ British Medical Journal, 1911, vol. i, p. 255.

² Semaine Médicale, October 12, 1910.

As this sign tells in proportion to the degree of the lesion it cannot claim diagnostic earliness or delicacy, but chiefly that it is easily available for the purpose of confirmation.

THE EXPLORATORY PUNCTURE OF THE MARROW BONE AS A CLINICAL METHOD OF BLOOD EXAMINATION is the subject of a second report, with 24 cases, by its originator, Prof. G. Ghedini,¹ of Genoa. He refers to the exploratory methods of puncture of other organs, particularly the superficial lymphatic glands, the spleen, the liver, the lungs, etc., all previously practised by Lucatello and others. He has found the method of "bone puncture" simple and safe.

"LE SIGNE DU LACET." Frugoni and Guigni² find that in patients with any hemorrhagic tendency, after applying a ligature to the arm, not too tightly, hemorrhagic manifestations arise in the peripheral end of the limb, and that these are similar to those produced spontaneously by the disease. This is an excellent prognosis test for the disappearance of the tendency to hemorrhage. The ligature is to be applied much less tightly than for Bier's hyperemia. Their first experience was gained in young women with purpura hæmorrhagica.

INHERITED HEMORRHAGIC TELANGIECTASIS has now been reported in about fifteen families since W. Osler's original observation, in 1901. It is distinct from hemophilia, as a mainly vascular affection of capillaries and smaller veins, leading to frequent hemorrhage, and sometimes to fatal epistaxis, but amenable to cauterization and perhaps to radium, and benefited by calcium lactate. His own fifth case is described in a paper which he contributes, in Italian, to the *Riforma Medica* (January 16, 1911).

THE ESTIMATION OF CARDIAC AND RENAL HYDREMIA. There are two clinical methods³ of estimating the early onset of hydremia before it has culminated in obvious edema: the gravimetric, and the refractometric method. Widal has long advocated and used daily weighings for the detection of incipient retention of fluids. The refractometer now enables him to apportion the derivation of the increase in body weight between the blood and the tissues. It shows that there is an "edema of the blood" as well as an edema of the tissues. It also shows that the hydremic dilution of the blood is maintained while the tissues are being drained of their soakage by digitalis and salt-poor diet. And again it enables a distinction to be made between legitimate recovery in weight and that which is due to a relapse of the edema.

THE HYPEREMIA TEST FOR ARTERIAL OBSTRUCTION, described by Moszkowicz,⁴ as a means of determining the area of the viable tissues

¹ *Riforma Med.*, January 16, 1911; *Clin. Med. Ital.*, 1908; *Wien. klin. Wochenschrift*, 1910, No. 51, p. 1840.

² *Semaine Médicale*, January 18, 1911.

³ Widal, Benart, and Vaucher, *Semaine Médicale*, February 1, 1911.

⁴ *Mitteilungen aus den Grenzgebieten*, 1907, vol. xvii.

in the local ischemias due to advanced arteriosclerosis, has been elaborated by Matas¹ as the most practical *test for the local efficiency of the collateral circulation*, in its bearing upon the question of amputating, and as to the choice of the level for the amputation. He uses for its performance the old "Massachusetts Compressor" of thirty years ago.

Its Medical Aspects, with which we are mainly concerned, are of great importance, as the technique is not only available for a reliable diagnosis of arterial disease, but is the basis of a therapeutic method, which I have used extensively and fully described under the name of "Interrupted Circulation,"² after its original employment by Harvey Cushing in Raynaud's disease. That procedure consists in driving all the blood out of a limb by an Esmarch's bandage from its extremity upward, and securing an Esmarch rubber tourniquet around its upper end for a few minutes (from five to ten minutes in Matas' test, though therapeutically I never have exceeded five minutes). The behavior of the local return of the circulation on removing the tourniquet, and the varying delay and distribution of the spreading redux wave of hyperemia as a pink blush, which in arterial obstruction remains marbled with persistent blanched islands or areas, constitute the test for the degree of the arterial disease and for the efficiency of the collateral circulation.

As a Therapeutic Agent the method is unique. It is analogous to a local bleeding in its draining effect upon, with subsequent replenishment of, tissue circulation. But it is vastly more potent, both in its spoliative action and in its secondary nutritional action, as, in bleeding, the limb is never made completely exsanguine, and cannot therefore be entirely recharged with absolutely fresh arterial plasma.

The searching spoliation of the tissues of their tissue-fluid is something more than is wrought by the original wringing inflicted by the spiral bandage. When the latter is removed, immediately after the application of the tourniquet, a universal suction is set up upon any available fluids still remaining between the cells by the elastic reopening, throughout the limb, of all the obliterated arterial and capillary lumina. But as that supply has been squeezed almost dry, it is inevitable that the intracellular juices themselves should now also be placed under suction. We know of no other method which can search the individual cells to any comparable extent.

If, however, there should be some *pathological* supply of fluid, as, for example, in synovial effusion, we might expect it to be drawn upon; and much more, if the effusion should be periarticular. That is the result which I have found to occur in both directions in various forms of arthritis.

¹ Annals of Surgery, January, 1911.

² Lancet, 1904, vol. ii, p. 442; Royal Medical and Chirurgical Transactions, 1906, vol. lxxxix.

By far the most striking instance is that of the peracute arthritis of rheumatic fever. The immediate diminution of the swelling is perceptible to the eye, and persists for hours; and the relief of the pain is likewise immediate, always considerable, and often so complete as to allow at once of painless movement. It is also permanent for many hours, even for twenty-four hours. All this in spite of the fact that, for obvious reasons, the squeezing out by the pressure of the bandage cannot be effected so powerfully as in other cases, and particularly not over the acute swelling, where the pressure has to be suitably modified, but where a separate bandage may be kept applied, with guardedly increasing pressure, after the removal of the main bandage, during the period of tourniquet anemia.

This is the most telling illustration of the working principle of the method. The same principle is also operative, although at a much lower potential, in bleeding. It is that of getting rid of the offending accumulation of perverted juices, and of substituting for them, as completely as possible, a healing supply of arterial plasma, direct from the lungs. That agency forms part of the mechanism of relief in the "local" bleedings by cupping or leeches. In our "general" bleedings, its relative inferiority lies in the fact that the supply which is substituted is derived from inferior and incomplete blood, pauperized and hydrated as a result of the depletion.

Heart Treatment. THE FAILURES OF DIGITALIS are considered from the standpoint of "fibrillation," by J. Davenport Windle,¹ who contrasts the purely rheumatic cases with those of less favorable origin. J. Mackenzie has established that the best effects are obtained in cases of persistent and absolute irregularity with "ventricular venous pulse," of the "nodal rhythm" type. As the same type prevails in the unfavorable group, Windle suggests that the difference is due to the presence or absence of a terminal renal toxemia, and that it points to the diagnosis of the latter, where there is doubt as to the predominance of the renal or arterial degeneration.

Cushny considers that digitalis is generally given in too small doses. The patient should get as much of it as he can stand; a dram or a dram and a half a day for a continuance, until it produces nausea. In man it does not, as in animals, produce increased systolic blood pressure. Mackenzie has shown that auricular fibrillation may continue under its use, even while the ventricular action becomes more regular; as though the ventricle was being saved from the undue frequency of the auricular impulses.

HEART TONICS. *Strychnine* is stated by Cushny,² on experimental evidence, not to be a cardiac remedy, yet probably useful as a vasomotor

¹ British Medical Journal, 1911, vol. i, p. 423.

² Proceedings of the Royal Society of Medicine, November, 1910.

tonic when the heart failure is from splanchnic relaxation due to a deficient excitability of the vasoconstrictor centre.

Langdon Brown, however, in his *Physiological Principles in Treatment*, cannot wholly agree with Cushny, as he has had, in heart block, more striking results from strychnine than from any other drug. He also mentions R. W. Michel's recommendation, in Allbutt's *System*, of hypodermic strychnine with morphine instead of digitalis in the arrhythmia of the overworked "athletic heart," together with diuretin and the hot pack, to lower pressure.

The Benefits of Cane Sugar in Heart Affections are dwelt upon by A. Goulston and by Sir James Sawyer.¹ The latter regards it as a valuable tonic for the body as well as the heart, in addition to its nutritive value.

Nitroglycerin, according to Tyson, is too often prescribed haphazard where high tension would be better treated by removing the cause. He reminds one of the results often given by $\frac{1}{6}$ -grain doses of elaterin; and of the value of diuresis obtained from the theobromine derivatives. The best remedies are still digitalis, strophanthus, caffeine; and sparteine sulphate too, though in not less than 1 or 2-grain doses every four hours. Other remedies (adonidin, convallaria, cactus, apocynum, spartein, and barium chloride) are reviewed in the *Journal* (vol. lvi, p. 976), with the wholesome conclusion that they are practically "inferior drugs."

SURGICAL MEASURES. *Cardiolysis*, in the 28 cases (in Europe) which Roux-Berger² reviews, gave good results in 21. Relief is to be expected only when there is actual adhesion to the chest wall; and only when there is some response to a vigorous preliminary medical treatment.

The Treatment of Phlebitis advocated by H. Fischer³ is simple, quick, and also safe, provided the thrombosis does not extend upward beyond the reach of the pressure of the bandage. That firm pressure is the secret of the "rapid absorption" of the clot; and this constitutes a great advance over the old treatment by rest.

BLEEDING AND LEECHING, AND THEIR BLOODLESS SUBSTITUTES. *Bleeding by Aspiration.* A first duty is to make amends for an oversight in our last year's Report (September, 1910, p. 59). Heinrich Stern, of New York, had practised bloodletting by venepuncture since 1905,⁴ and he again describes his original apparatus in an important paper on "Bloodletting in Children."⁵ His strong advocacy of the method is based upon cogent reasons which are discussed in my work

¹ British Medical Journal, March 18 and April 1, 1911.

² Semaine Médicale, September 7, 1910.

³ Wien. med. Klin., November 30, 1910.

⁴ Medical Record, p. 1043.

⁵ Journal of the American Medical Association, 1910, p. 1781.

on the *Therapeutics of Bleeding and Leeching*.¹ An illustration of Stern's trocar and a description of its employment will be found in the *New York Medical Record* for 1905, p. 1043. It differs from Strauss' venepuncture needle in consisting of a smooth tipped cannula with withdrawable perforator, and in being therefore free from the risk of wounding the vein while lying within it, and lastly in affording special facilities for the subsequent injection of saline infusion if required.

Stern states that venepuncture is destined to take the place of venesection in almost every instance, because of greater safety, simplicity, convenience, cleanliness, and rapidity of the performance. The entry of air into the vein is also completely avoided. As regards operative facilities, the operation can be successfully achieved in as many as 95 per cent. of all cases.

Venesection in Disorders of the Circulation, and its "Bloodless Substitute." Von Tabora is the first to recognize the preëminent virtues of venesection. The relief which it affords to the venous pressure is immediate; and he reserves it exclusively for cases where the pressure reading is very high; trusting in others to simpler means, such as cardiac stimulants and tonics. (1) The greatest effect upon the venous pressure is to be obtained from venesection provided this is pushed to not less than 300 or 500 c.c.; (2) next in efficacy comes his "bloodless substitute" for it—systematic limb ligature; (3) the combination of the two procedures, which constitute his own original method, represent a proportionately higher therapeutic value; and (4) this can be further augmented by the association with it of suitable medication.

The alternative method by "limb ligature" is of course altogether inoperative in reducing the viscosity of the blood. But in the other directions it works along the same lines as venesection, though at a lower power. On the other hand, it is free from the objection of robbing the economy of any of its blood, an objection which has restrained v. Tabora from any free resort to bleeding, and which has led Tarnai to trust exclusively to limb ligature.

D. von Tabora's conclusions are as follows:

1. Venesection, as well as limb ligature, is capable of considerably lowering an abnormally high venous pressure, and of thereby improving the circulation.

2. Venesections smaller than 300 to 500 c.c. have no effect in that sense worth mentioning.

3. In bad cases of broken compensation, special efficacy belongs to the administration of digitalis preparations combined with one of these methods of unloading the venous system.

4. Whereas, in loss of compensation of primary cardiac origin there is an early rise in the venous pressure, that rise is not, as a rule, present

¹ The *Therapeutics of Bleeding and Leeching: Their Twentieth Century Principles and Prospects*, London, Baillière, Tindall & Cox, 1911.

in the disturbance of the circulation due to pneumonia, which is brought about by vasomotor failure. If, however, it should develop, this would point to failure of cardiac strength, and may be taken as an indication for venesection. But a "bad pulse" always calls for caution, particularly in pneumonia.

Von Tabora's Method. To unburden the pulmonary circulation, v. Tabora recognizes two possible lines of action: (1) To lower the pressure in the venæ cavæ and right auricle, thereby diminishing the systolic charge of the right ventricle—and this may be effected by venesection; or (2) to increase the systolic charge of the left ventricle as a means of reducing the pulmonary engorgement—and this might be effected by the administration of heart stimulants and tonics.

Either method increases and accelerates the circulation by augmenting the difference between the pressures at its two ends. But, he argues, this advantage can be obtained by venesection "only" when the venous pressure is higher than normal, and therefore capable of reduction; otherwise venesection must be futile. The phlebotonometer will therefore decide whether to bleed, and how much. If the venous pressure should be normal, we should not bleed.

Limb Ligature as a "Substitute" for Venesection, when a sufficiently large bloodlet is not justifiable, is an efficient remedy; it was termed by v. Dusch a "bloodless venesection." Its chief drawback is the time which it takes to obtain the result, viz., ten to twenty minutes at a minimum, and one to two hours to give it some permanence—an ordeal sometimes objected to, although v. Tabora's results are described as eminently satisfactory.

Limb Ligature as an "Adjunct" to Venesection has proved to be most useful in many cases. This is v. Tabora's own special clinical method. His technique is to *follow up* a small venesection by limb-ligature, and thus to complete its effect. The ligatures in all cases have to be loosened very gradually for obvious reasons.

As Regards the Selection of Cases, v. Tabora divides them into two groups, the cardiac and the pneumonic. The cases best suited for his method belong to the former, and particularly to the early stage of loss of compensation in mitral disease or in affections of the myocardium. He points out that mere valvular defects, so long as they are well compensated, *do not raise the venous pressure*, except in some cases of tricuspid insufficiency.

The pneumonic group differs essentially from the cardiac in the mechanism of the pulmonary congestion. The circulatory disturbance is due not to cardiac, but to central vasomotor failure. This lowers the arterial pressure, and the venous as well. Day after day the venous pressure may not show any increase; but if cardiac weakness should set in, this will immediately rise; and the advent of pulmonary edema raises it very considerably. The onset of the rise is the indication for

venesection, and also for limb ligature. In pneumonia, the lowering of the arterial pressure by venesection is much greater than in any other cases. A fall equivalent to as much as 20 mm. of mercury was sometimes recorded. Nevertheless all the cases did well. But, as a weak pulse is always a serious matter in pneumonia, it is essential to make up for the loss of vasomotor tone by stimulants and vasoconstrictors such as adrenalin, barium chloride, and others.

In this report we must limit our criticism, more fully given elsewhere, to those views of v. Tabora which relate to the mode of action of venesection, quoting only our remarks, written prior to any acquaintance with v. Tabora's work, on the use of limb ligature and on "arterial derivation" of the blood in "general" bleeding.

It is not apparent from v. Tabora's remarks that he agrees with me in recognizing that, in the customary procedure for venesection, *the blood is not drawn from the right heart, but from the left*. They almost imply that he regards the advantage conferred upon the left ventricle not only as a later event, but as a mere sequel to a direct abstraction of blood from the right side of the heart. The reasons for taking the precisely opposite view of the sequence and of the causation are that, although the venous circulation is accelerated by the incision in the arm, *it cannot be reversed* because of the valves—except in a short stretch of those swollen veins controlled by the bandage which are situated above the incision; and that the blood which encumbers the great veins and the right heart has therefore to be drawn, in its entirety, along the normal route through the lungs, by the left ventricle itself, upon which the hemorrhage takes the *primary effect* by accelerating its emptying owing to the draft which is made upon the contents and upon the blood pressure of the aorta.

The Essentially Arterial Action of Venesection, and the Mechanism of its Relief to the Right and to the Left Heart. "In phlebotomy the importance of the apparently trivial 'bandaging' of the arm is apt to be overlooked. The genuinely 'arterial' mechanism of the bleeding has a close bearing upon the theory and practice of 'limb ligature' as a therapeutic method, the uses of which we shall have to discuss later. Limb ligature 'holds up' so much venous blood in the limb; more or less blood according to its duration. If phlebotomy should then be practised, it will empty all that venous blood from the 'excluded' veins, but none from the large central veins. But if it should not be practised, then eventually all the blood will pass through, onward. The work of the right heart will, however, have been temporarily assisted by a diminution of its intake corresponding to the volume of that blood, and to the duration of its 'exclusion;' while the work of the left heart will also have been immediately, and gradually more and more, assisted by a progressive diminution of the total blood volume in active circulation."

"If there is to be no venesection the object will be to increase and

to prolong that temporary relief, which is in effect venous as well as arterial. If, however, venesection be contemplated, as this will immediately set up considerable arterial relief with the effect of rapidly relieving the right heart, it would be superfluous to spend much time in working at the venous end of the circulation for so slow and limited a venous relief, while inflicting unnecessary distress or discomfort upon the patient. But there would be a practical object in applying multiple limb ligatures immediately before the venesection, 'to intensify' its arterial effect by the preliminary instalment of venous relief and of heart encouragement afforded by the exclusion. This will leave less work for the left ventricle to achieve, and it will enable that work to be achieved with a smaller output."

Artificial Curtailment of the Systemic Blood Circuit as an Effective Method of Treatment. Under this title J. Tornai,¹ of Budapest, reports striking clinical results from a method suggested to him by R. Klapp's paper on "Anesthesia with Artificially Diminished Blood Circuit."²

By ligaturing the four limbs Klapp was imitating the effect of anemia in facilitating anesthesia by smaller doses than needed for the full-blooded, and with a more rapid and easy recovery. On this plan Tornai's original aim was to obtain, by limb ligature, the full therapeutic effects of drugs, and in particular of heart tonics, from "minimal" doses. But ligatures fit to keep up passive hyperemia for periods of one hour were not sufficiently tight to occlude the arteries, and therefore to prevent leakage of the minimal doses injected subcutaneously into the temporarily "excluded" districts.

Tornai found, however, a more promising field of study in limb ligature for its own sake, as a means of relief to an oppressed circulation.

Tornai's Technique. A suitably thick rubber tube is tightened and clamped twice around the root of each limb, while the pulse is kept under observation in the radial artery or in the posterior tibial or dorsalis pedis. The highest degree of passive hyperemia is to be obtained, as shown by Zur Vert, by limiting the constriction of the main artery to a degree *corresponding to the diastolic* blood pressure. This can easily be arrived at, without any pneumatic cuff and without a manometer, by the stethoscopic method of Korotkow. This sudden weakening of the pressure murmur while the tube is being gradually relaxed can be used as the guide for clamping the tube. It is still simpler, however, to be guided by the finger on the pulse.

The Clinical Technique. The patients (most of them were in a medium stage of decompensation, but free from anasarca) were given one or two sittings a day of twenty to thirty minutes, for a period of one or two weeks; and this was usually well borne. They were kept

¹ Berliner klin. Wochenschrift, January 30, 1911, p. 203.

² Therap. Monats., 1910, No. 1.

under continuous observation, and any faintness was immediately relieved by loosening the ligatures.

The pulse rate and amplitude were found to rise, and likewise the blood pressure. This rise in pressure, which is more marked in the systolic than in the diastolic phase, is according to Tornai an objection to the use which is still sometimes made of limb ligature for the relief of hemorrhages, whether nasal, cerebral, pulmonary, or in the alimentary canal. It would then presumably tend rather to increase than to check the bleeding. It is clear, however, that the same objection need not apply to cases where we have to deal not so much with the danger from a continuance of the hemorrhage, as with its result—the danger of fatal syncope from excessive anemia and from an excessive reduction of the blood pressure.

The beneficial effect upon the *heart's action* was found to outlast the temporary relief afforded to the right heart by diminishing its intake, and the stimulation given to the left heart by lessening the column of blood to be propelled by it. The improvement was still perceptible after the excluded venous blood had been gradually thrown into circulation again by "carefully graduated" relaxation of the ligatures.

The Immediate Results of the ligaturing upon the right and the left heart were demonstrated by skiagraphic measurements of the marked "recession" of the right cardiac border, and by the auscultatory recognition of a diminished intensity (due to lessened blood volume) of both arterial second sounds (sometimes even with a disappearance of any pre-existing diastolic arterial murmur), and also of an increased loudness in the systolic pressure murmur beyond the ligature, showing increased velocity of blood due to improved systolic energy. This was also borne out by the frequent occurrence of diuresis as a result of the systematic treatment. Sometimes too a profuse perspiration was induced by the ligaturing.

In connection with the demonstrable shrinkage of the heart, Tornai remarks that the proceeding might be turned to account for *diagnostic* purposes, and might enable us to judge whether an extension of the right border was due to a simple overloading or to a displacement of the heart.

The Selection of Cases for treatment included those in which the anasarca was limited to the lower extremities. In these, the ligature was applied to the arms only, with satisfactory results as regards the edema. In general, however, little was achieved in cases where all medication had previously failed.

The most favorable cases were those of mitral disease free from the worst symptoms. Good results were also obtained in some cases of myocardial weakness and of the "beer drinker's heart;" and also in a case of bronchitis due to passive congestion. It is noteworthy that great improvement in the respiration was often experienced by dyspneic

patients after the sittings of treatment. The "general clinical condition" was so much improved in the majority of instances that Tornai feels justified in recommending this simple method for extensive trial in disorders of the circulation, as an adjunct to other therapeutic means.

Transfusion is much facilitated by a mechanical device by A. L. Soresi, of New York,¹ whereby each of the two vessels is clasped within

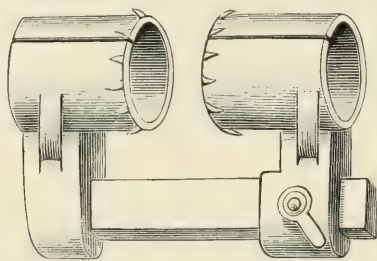


FIG. 8.—Soresi's instrument for transfusion, cylinder complete.

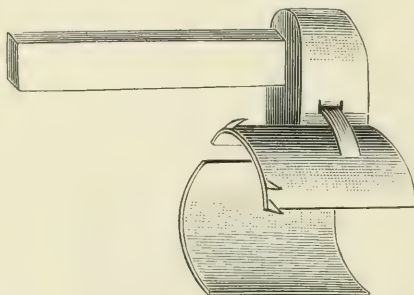


FIG. 9.—Cylinder open.

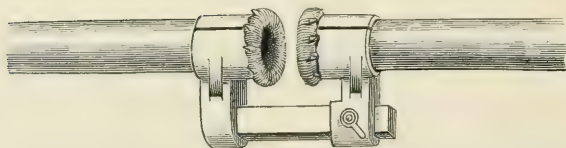


FIG. 10.—Bloodvessels ready to be anastomosed.

a short metallic tube or collar, made to open; and is cuffed back over its free end like the lapel of a sleeve. When approximated, both tubes slide along a single bar into perfect apposition, and are fixed by a screw, after dividing the vessels. The open mouths being in exact continuity, the ligatures are then released. The mechanism is well shown in Figs. 8, 9, and 10.

¹ Journal American Medical Association, April 1, 1911, p. 622.

Full details will be found in the original. Local cocaine anesthesia is sufficient (1 to 500). No special instruments are required beyond a suitable knife, forceps, and scissors.

As this method gives a very free passage, Soresi warns us to keep an efficient check with the finger on the vessel of supply, to guard the donor from the risk of syncope, and the recipient from that of acute dilatation of the right heart.

The Venepuncture Transfusion Method advocated by Moritz¹ is much simpler; but it cannot claim to be so thoroughly reliable in the working as the more highly surgical methods of Carrel's suture or of Soresi's cylinder. All transfusion is open to the risks of blood incompatibility; and it would be well if it could be always preceded by systematic blood tests, to avoid hemolysis or intravenous agglutination.

Intravenous Injection Methods. The salvarsan treatment has brought the intravenous method somewhat suddenly into extensive use irrespective of any previous individual training. This has suggested various special devices for its safe performance, such as those advocated by v. Notthaft² and by Moritz, by Iversen, and by Benario.³ There are doubtless cases in which even the expert may be grateful for additional mechanical facilities, but he usually prefers the elementary technique of self-help, and the plain method of simple venepuncture.

¹ Münch. med. Wochenschrift, February 21.

² Deut. med. Wochenschrift, February 2.

³ Münch. med. Wochenschrift, February 11.

DERMATOLOGY AND SYPHILIS

BY WILLIAM S. GOTTHEIL, M.D.

DERMATOLOGY

Acne Bacillus Suspensions. For several years past Engman has been advocating the employment of acne bacillus suspensions in the treatment of obstinate cases of the disease. Reference has been made repeatedly in these pages to the various local methods of treating the malady that have proved successful in my experience, curettage, hyperemia, peeling, etc.; yet it cannot be denied that there are certain cases that resist all our efforts. I refer not so much to cases of the ordinary type, which respond fairly well to our local measures, but have persistent slight recrudescences of the eruption; I refer to the rarer, extremely extensive and obstinate cases, in which the entire back as well as the face is involved, and in which the extent, severity, and obstinacy of the lesions render local treatment alone an almost hopeless task. Two such cases have recently been under my care; in both of them the entire back, shoulders, face, and neck were studded with indurations, pustules and scars of all sizes, and in one of whom the appearance of keloidal excrescences at the site of each acne scar rendered the affection a very serious and objectionable condition. For cases such as these, the successful elaboration of a method such as Engman's would be most desirable; and I have tried it with results that will be mentioned later.

Engman¹ holds, of course, that acne is a bacterial disease, due to a specific bacterium, the one that Unna, Saboureaud, and he described some ten years ago, and that Gilchrist designated *Bacillus Acnes*. Of course, the ordinary phenomena of the disease, and more especially the frankly suppurative lesions, are held to be due to mixed infection; so that some of the observers who have experimented in this direction have used mixed vaccines of the ordinary pus organisms and the specific acne bacillus. Others used cultures of the acne bacillus alone. On account of the impossible amount of detail laboratory work involved, it has been out of the question to make autogenous vaccines in each case, so that, in most instances, stock vaccines were used. Engman reports on 208 cases, 40 of which were treated with staphylococcic suspensions, and 168 with acne bacillus suspensions. His first results

¹ Interstate Medical Journal, vol. xvii, No. 12.

were not very satisfactory; but now that the technique has been perfected, they are very different. He does not hesitate to call the injections the most brilliant therapeutic agent that he has yet seen in dermatology.

It would take too long to enter upon the details of the treatment as advocated by Engman, and a method that requires a laboratory and the minute attention to details that is insisted upon must be very generally and very remarkably successful to be adopted by the general practitioner. It must be tried out by other specialists, and it must either be so simplified as to be available for office work, or the disease must be important enough, as is the case with syphilis in connection with the serum reaction, to warrant the employment of the specialist laboratory worker in our diagnostic or therapeutic efforts. Neither of the two latter conditions are fulfilled by acne and the acne bacillus suspension treatment. And even as regards the efficacy of the treatment under unusual and the best conditions, the opinions of the dermatological world is divided. On the one side stand two or three investigators who have gotten very remarkable results from these suspensions; on the other are all the other dermatotherapists, who have not been able to obtain them. I myself have employed the autogenous vaccines in several very bad cases, having had the cultures prepared in the Cornell University Laboratory, and following Engmann's directions closely, and I have been unable to convince myself that there have been any good effects at all. One or two cases improved for a time, and then relapsed; others began to do well as soon as a vigorous local treatment *secundum artem* was employed as well. At present we must say, so far at least as the general practitioner is concerned, that the vaccine treatment of acne is not to be recommended.

Alcohol in Dermal Therapeutics. Though but little employed, alcohol has a wide range of usefulness in dermatology, both as a vehicle for other drugs and as a direct therapeutic agent. Bulkley,¹ in a recent article, has again called attention to this neglected agent. Among the older writers, Wilson, Salzwedel, Heuss, Romme, and many others have recommended its external use for phlegmonous and other inflammations; and more recently the testimony as to its value has been increasing. As a menstruum for the application of the tars, mercurials, etc., it can be used when the common oily or fatty vehicles are inapplicable. As a direct agent it has been employed in more recent times by Kaufmann,² as a deodorant; by Soweckjew,³ in various inflammatory processes of the skin and subcutaneous tissue; by Kaiser,⁴ who treated many cases of inflammatory skin affections with alcohol dressings,

¹ New York State Journal of Medicine, February, 1910.

² Monatshefte für Praktische Dermatologie, 1903, vol. vi, p. 214.

³ Ibid., vol. xxxvii, p. 58.

⁴ Ibid., 1904, vol. xxxix, p. 552.

and who reports that nothing better could be desired; by Lauder Brunton,¹ who states that absolute alcohol will check the itching of pruritus ani; by Dupas,² who advises a 90 per cent. alcohol for the treatment of herpes zoster, and by many others.

An important contribution to the subject has recently been made by Bockhart,³ who still holds to the parasitic theory in the etiology of *eczema* which, in conjunction with Bender and Gerlach, he proclaimed in 1901.⁴ This theory still lacks confirmation, but there can be no doubt as to the value of the local alcohol medication in many common and often obstinate dermal affections.

Calling attention to the fact that, in most eczematous and dermatic inflammations of the skin, the ordinary disinfectants in watery solution cannot be employed, Bockhart turns to alcohol, known to be one of the most effective of the class, and one that, properly used, is well borne in a large number of cases. He employs it for three purposes: To destroy the bacteria and their toxins on the affected skin; to prevent the complicating pyodermitides, impetigos, and furunculoses; and finally, to prevent further attacks. To these indications I would add another; alcohol is one of our most valuable antipruritic agents, and we do not possess too many of them.

Bockhart has for many years treated all his *eczema* cases, of whatever variety, with alcohol, in addition to the other means employed. The only exceptions have been the most acute cases, with excessive secretion, fissuring, etc. He uses, as a rule, the 90 per cent. spirit, although in very sensitive cases it may be still more diluted. Twice a day the affected area and all the surrounding tissue is thoroughly cleansed with cotton dipped in the alcohol; the excess of fluid, if it does not evaporate, is removed with fresh cotton. Between times of the two alcohol cleansings, the appropriate treatment with powders, salves, etc., is carried on.

While these alcohol cleansings have a good effect on the disease, their subjective action is still more important. The itching, by far the most serious symptom from the patient's point of view, is markedly relieved. This is seen in one of the most obstinate and distressing of the *eczemas*, the chronic and verrucous *eczemas* of the anus. Bockhart claims to have found almost pure cultures of staphylococci in the fissures and folds of patches of this affection, and he assumes that the relief obtained from the alcohol is due to the bactericidal action of the alcohol. Be that as it may, the careful alcohol disinfection of the many small fissures and rhagades which are present in this affection is followed

¹ Lectures on the Action of Medicines, 1903, p. 153.

² British Journal of Dermatology, 1891, vol iii, p. 269.

³ Monatshefte für Praktische Dermatologie, January 1, 1911.

⁴ Ibid., 1901.

by cessation of the itching for quite a long time; and if this process is repeated several times a day, the whole course of this essentially pruriginous affection may be itchless. The patients stop scratching, and the hyperkeratoses get a chance to heal. One most obstinate case, which had lasted over twenty years, and had been given up as incurable, and in which the affected skin was 2 to 3 cm. thick in places, was cured in six months by careful disinfection three times a day, following the application of a 10 to 20 per cent. solution of Liquor Carbonis Detergens. And not only does the alcohol disinfection promote the patient's comfort and prevent mechanical injury, but it shortens the period of the disease, and after its cure seems to be efficacious in preventing relapse. Hence it is advisable to employ it as a prophylactic measure long after the inflammatory attack has run its course.

In the frankly bacterial skin affections, such as *impetigo*, *ecthyma*, and *furunculosis*, the alcohol treatment would certainly seem indicated, provided the inflamed skin will stand its use. I have long employed it in furunculosis of the neck, for which my standard treatment is shaving, cupping, careful disinfection, and the application of a permanent antiseptic dressing as nearly occlusive as possible. As an effective bichloride wet-dressing is often too irritating, I have formerly used boric acid. Lately, I have recommended 50 per cent. alcohol compresses in its place, and have been well pleased with the result.

One further suggestion is worthy of note. The disinfectant action of iodine in alcoholic solution is now largely used by surgeons and it might be of value in dermatology. Bockhart had used it in a few cases as a 1 to 10 alcoholic dilution of tincture of iodine, this being painted over the affected surface several times a day. I have had no personal experience with it myself, and I should advise caution in its use, as the frequently repeated irritant action of the alcohol and the iodine might readily increase the dermal inflammation. The iodized alcohol, however, perhaps still more diluted than in the above formula, might be tried for the disinfectant and antipruritic action for which alcohol alone has been advocated in the foregoing.

Baldness and Baldness Cures. It is a number of years since this subject was last referred to in these pages;¹ on which occasion I deprecated the common attitude to this affection as a joke, and the relegation of its treatment to barbers and beauty shops. It is certainly a disadvantage, and a serious one when it occurs in the young; and it is almost a misfortune when it occurs at any time in the life of a woman. It is often due to preventable causes or to contagions, and it should be seriously treated by physicians. In this connection, a reproduction of a scheme of the causes of baldness, slightly altered from that published a number of years ago by Schamberg, will be useful; for a recognition of its etiology is the first step in the successful treatment of the affection.

¹ PROGRESSIVE MEDICINE, September, 1904, p. 107.

I. Alopecia due to general causes	1. Natural or physiological alopecia	(a) Congenital alopecia. (b) Senile alopecia. (c) Premature alopecia.	
		(a) Alopecia due to acute general diseases	Eruptive fevers (such as scarlet fever). Variola. Typhoid. Pregnancy. Operations.
	2. Pathological alopecia		
		(b) Alopecia due to chronic general diseases	Syphilis. Chronic intoxications. Anemia. Diabetes. Cancer. Phthisis. Neurasthenia. Leprosy. Myxedema. Uric acid diathesis.
II. Alopecia due to local causes	1. Diseases in which alopecia occurs only incidentally	Seborrhea. Erysipelas. Psoriasis. Syphilodermata. Folliculitis. Lupus erythematosus.	
	2. Diseases in which alopecia is a chief symptom	Alopecia areata. Ringworm. Favus. Eczema seborrhœicum.	

All these affections may be the cause of baldness, circumscribed or general. We shall not deal here, however, with the various acute and chronic conditions in which baldness may be a symptom; but shall confine ourselves to the common forms of premature or senile alopecia, which not uncommonly have as their root the very prevalent scalp affections known as seborrhea or eczema seborrhœicum. It is into this category, after all, that the great mass of the cases that come before us must be referred.

Incidental reference may be made here to a cause of baldness in the young which has lately had the support of various authorities, and which is of importance in consequence of the growing prevalence of the habit of pursuing open-air business and recreation without any head covering. Grawitz showed, some time ago, that too much indulgence in sun baths is prejudicial to the human organism, causing irritability and nervousness, cardiac and circulatory disturbances, and more or less serious dermal lesions. The skin and its appendages were found to be peculiarly susceptible to the sun's rays; and at the recent meeting of the American Dermatological Association, in Boston, Harding and others proclaimed their belief, based on a long series of cases, that prolonged exposure to the rays of the sun finally caused marked baldness, with a bad prognosis as to recovery. The similarity of effect of the high actinic rays of the sun and the x -rays were pointed out, and stress was

naturally laid on the occurrence of radiocarcinoma on the one hand, and xeroderma pigmentosum on the other hand. Both agents seem undoubtedly capable, on occasion, of profoundly affecting the epithelial structures.

Nevertheless, it does not seem to me that the evidence is sufficiently conclusive for us to decide that the hatless habit is one to be frowned upon. Savages in many tropical regions, in which the actinic rays are much more powerful than in our more temperate zone, go habitually without head covering; and I do not know that baldness is especially prevalent among them. Moreover, it is a question whether the interference with the circulation undoubtedly occasioned by our modern hat-bands is not at least as injurious to hair growth as exposure to the actinic rays can be.

Almost every dermatologist has his own favorite method of *treatment* of the ordinary forms of baldness here under consideration. MacKee¹ even advises the use of the following to prevent loss of the hair: Pilocarpine hydrochloride, 5 grains; oil of rosemary, 8 drops; tincture of cantharides, $\frac{1}{2}$ ounce; glycerin, 1 ounce; sweet almond oil, 2 ounces; spirit of camphor, 3 ounces; to be used twice daily. For pronounced baldness, he advises keeping the scalp thoroughly clean, and the use of a 6 per cent. chrysarobin vaselin twice weekly, or of a 50 per cent. lactic acid solution in water or alcohol swabbed on. Both methods of treatment seem to me to be rather severe; the chrysarobin used on the head is very liable to be carried to the eyes and occasion disagreeable conjunctivitis, besides staining the skin and hair. For the seborrheal forms of the affection, MacKee employs a formula very similar to my own: Resorcinol, 1 to 3 drams; croton oil, 4 to 20 minims; castor oil, 10 to 30 minims, and alcohol or bay rum, 4 ounces.

Bizard² recommends pilocarpine, 1 to 200, in alcoholic or oily solution in seborrheal or presenile calvities; he uses the salt, as the jaborandi preparations are too uncertain. Saboureaud³ recommends, especially for women, frequent washing of the hair with a non-alcoholic soap, and the use of the following wash: Pilocarpine hydrochloride, 3 grains; water sufficient to dissolve; spirit of lavender, spirit of ether, of each 5 drams; ammonia water, $\frac{1}{2}$ dram, and alcohol, enough to make 8 ounces. Heidingsfeld⁴ has a stock solution as follows: Resorcinol, 5 gm.; chloral, 50 gm.; distilled water, 1000 c.c., which he modifies in accordance with the indications of the individual case. If the seborrhea persists, the resorcinol and chloral are eliminated, and tartaric and tannic acid in small amounts substituted. White⁵ has lately proposed a formula

¹ New England Medical Monthly, August, 1909.

² Monatshefte für praktische Dermatologie, October 15, 1909, p. 362.

³ Ibid.

⁴ Ohio State Medical Journal, July, 1910.

⁵ Journal of the American Medical Association, September 24, 1910.

which I have used with considerable satisfaction this winter. It is: Euresol (monacetate of resorcinol), 8 gm.; castor oil, 4 c.c. to 12 c.c.; spirit formicarum, 30 c.c.; alcohol, 70 per cent., 250 c.c.

Personally, I favor the following plan of treatment, which I have used for many years, and see no occasion to change. The scalp is shampooed daily in men, and at least once a week in women, with a good tar soap. My regular solution is the following: Resorcin albissumum, 1 to 4 drams; glycerin, $\frac{1}{2}$ dram; tincture of capsicum, tincture of cantharides, of each, 1 dram to 1 ounce; cologne water, enough to make 8 fluidounces. Beginning with the weaker strengths, the amount of the active ingredients is gradually increased as the scalp requires it.

Finally, however, the whole matter of the treatment of baldness, apart from the special measures required by the presence of any definite disease of the scalp requiring the use of resorcin, sulphur, tannin, or what not, resolves itself into the question of stimulating the tissue of the scalp and increasing the blood supply of the hair follicles. I do not believe that it matters very much how it is done. The mechanical revolving brushes used in the English hair shops will effect it as well as anything else, provided they are clean. Out of the multitude of prescriptions, the practitioner can take his choice. All will lead to the desired result, provided they are used intelligently and persistently. By intelligently I mean applied properly with a brush, and not with the fingers, and by a second person who can see what is being done and not by the patient, and by one who has plenty of muscle and little sympathy. By persistently I mean for months and months, for the hair growing from the atrophied papillæ is very slow in coming forward. In my experience, women generally persist in the treatment and get results; men do not, and become bald.

Bromidrosis and Hyperidrosis of the Feet. Army surgeons are more frequently called upon to relieve this annoying and disgusting affection than are civil practitioners; and the various European army medical staffs have elaborated plans of treatment which are radical and effective, as is necessary where large bodies of men are domiciled in close and crowded quarters. Passing over with a mere mention the customary remedies used, cleanliness, frequent change of socks, the alcohols, formalin, salicylic acid, starch, etc., it will be interesting to note the method that Hale¹ describes as absolutely successful, and for which he cannot recall a single case of relapse. The patients are detained in the hospital but one day, and, when satisfied next morning that the instructions have been carried out, they are returned to duty at once, being told to report again in one week if symptoms of the disease remain. Hale is a believer in the theory of a specific germ for the disease, though he admits that uncleanness predisposes to it, and that

¹ Journal of the Royal Army Medical Corps, June, 1910.

flat-footed individuals are more prone to be affected than others. I may admit that the peculiar decomposition of the sweat and maceration of the epidermis of the bromidrosis may be of bacterial origin; but the hyperidrosis, which is fundamental, is probably neurotic, and of internal origin; and it is difficult to understand how the local measures employed can permanently stop the hypersecretion.

The patient with all his foot-gear is taken into the hospital. All his socks are soaked for an hour in 1 to 2000 bichloride solution, well rinsed three times in hot water, and then thoroughly washed. The entire insides of all his shoes are then painted with the following solution: Salicylic acid, 1 ounce; methylated spirit, 4 ounces. The feet are well washed, thoroughly dried, and are then themselves carefully painted with the same solution, special attention being paid to the interdigital clefts. The entire cutaneous surfaces become white from the decomposition of the salicylic acid after the alcohol has evaporated. A pair of the clean socks then put on; next morning the feet are repainted as before. Hale affirms that two treatments are all that is needed for a permanent cure; and that to maintain it all that is necessary is to continue to pay attention to the cleanliness of the feet and the foot-gear, which the patients readily do in view of the relief that they obtain from the treatment.

It would be gratifying if this simple treatment would be sufficient to permanently relieve the condition. It is good in its way, undoubtedly; but I question its invariable success in the hands of others. It is worth trying, however, in conjunction with other measures.

Skin Cancer. The last reference to this subject was made four years ago,¹ and it will be timely to review the work which has been done since, and to take stock of our present knowledge about it. Not that I have any very important new things to record; for during the whole period in question the attention of the dermatological world has been so exclusively directed toward the novelties in the diagnosis, prognosis, and treatment of syphilis that comparatively little attention has been paid to other affections. Yet the frequency of the affection and the fact that it falls to the lot of the general practitioner to treat, and more especially to handle it in its earlier and more manageable stages renders it well worthy of our attention. It is a matter of common knowledge, also, that a large percentage of these cases fall into the hands of advertisers, unauthorized practitioners, medical institutes, and the like. This is undoubtedly due in part to the fact that the affection in its early stages is very liable to be undiagnosed, or misdiagnosed, or ineffectively handled; and also to the fact that methods of treatment which are efficient, easy, and not repugnant to the patient are often rejected under the mistaken idea that the diagnosis of cancer, of whatever nature, and wherever seated, means a surgical operation. We may

¹ PROGRESSIVE MEDICINE, September, 1907, p. 94.

deprecate the unwillingness of our patients to undergo one for an affection that, to the patient's mind, may seem trivial; but I have repeatedly noticed that the same attitude is taken by physicians when affected with the disease; they eagerly grasp at the hope of a cure without the use of the knife, and are as anxious as their patients to avoid anesthesia and the operating table. The undoubted successful work of some of the cancer cure institutions in some of these cases is due to the fact that they employ the less repugnant methods which are still largely neglected by the profession itself. One point, however, must be emphasized at the outset. While all true cancers grow from the epithelium, and are in a broad way histologically alike, those originating in the covering epithelium of the skin and mucosa differ in essential points from those beginning in the deep epithelium of the glands. The former are slow in growth, benign in the sense that there is but little tendency in their prolonged earlier stages to have glandular or other metastases, and are purely local affections. The latter are much more rapid, and far more malignant, and they are certainly affections for which the early and radical employment of the knife is indicated. I have often been surprised, after a lecture or a paper on the treatment of these affections in which I have endeavored to emphasize this radical difference, by being asked whether the modes of treatment which I advocated would not be useful in cancer of the mamma or of the uterus. The remarks which I shall make apply only to cancer of the skin or of the visible mucosa; and even in these they do not apply to the latest and most advanced cases, in which the deeper tissues or neighboring lymph glands are already involved.

At the 1910 meeting of the American Medical Association, a number of papers were read in the Section on Dermatology, on various phases of cancer of the skin. Loeb¹ dealt with the *etiology*, considering the influence of internal and external factors. Of the former, we know very little; why a pigmented mole existing from birth should, late in life, develop into a melanotic cancer, or why a more youthful integument should be so sensitive to the chemical light rays as to show the carcinomatous phenomena of xeroderma pigmentosum are questions which are still unanswerable. Neither the embryonic theory of Cohnheim, nor Ribbert's idea of the cancer cell have sufficed to answer them. Of the external factors, however, we have much more knowledge. Of microorganisms, indeed, there is no proof; though we are not in a position to deny their influence in cancer with certainty, the probability of any such connection seems very slight at the present time. On the other hand, the influence of various external irritants is well known. Chronic irritation of any kind, mechanical or chemical, as well as that of the Röntgen ray, of radium, and of ultra-violet light rays,

¹ Journal of the American Medical Association, November 5, 1910.

are acknowledged causes of carcinomatous degeneration. On the whole, we are forced to conclude that, despite the most painstaking investigation, no light of any importance has been thrown upon the question of the cause of cancer.

The question of *treatment* was elaborately discussed by Pusey, Willy Meyer, and others. Of the various internal remedies which are from time to time proposed, the single one worthy of even the slightest consideration is *arsenic*, and that merely because its use has been advocated by some careful observers. Personally, I should be entirely unwilling to rely upon it for a moment. The only measures worthy of serious consideration are the local ones.

Excision remains today the most popular of these local means; but it has certain manifest disadvantages. It must be absolute, in the sense of removing every single affected cell, the incisions going through the healthy tissues only. Anything less than that, even to the cutting through of a single cell nest or a single proliferating epithelial offshoot, means failure and quick relapse. That this is of frequent occurrence in carcinoma of the face and head, where occur most of those with which the dermatologist has to deal, is shown by the statistics of Hochenegg's surgical clinic, in Vienna, where it is admitted that recurrence in and about the scar after operation is much commoner than is glandular recurrence. And that is not the whole story. All surgeons warn against the dangers of incision in carcinoma, even for the purpose of obtaining tissue for microscopic examination; the injury stimulates the disease and abnormally growing tissues, and opens up new lymphatic channels of absorption. In the skin especially the temptation will ever be present to sacrifice as little as possible; and hence recurrences after the knife are frequent. Other methods of destruction are therefore usually preferable; and if there should be at our disposal destructive agents having more or less of a selective action, or if there should be such differences between the carcinomatous and the normal cells, that certain agents will destroy the former and spare the latter, their advantage over the knife is increased. I believe, and have on more than one occasion attempted to prove that there are such agents, and such differences do exist.¹

All the lighter and more superficially acting agents usually called caustics, such as nitrate of silver and carbolic acid, are not only ineffective as destructive agents, but do positive harm inasmuch as they merely stimulate the abnormal tissue to increased growth without being destructive agents in any true sense of the word. They are, therefore, to be absolutely rejected for the treatment of the affection under consideration. The smaller, more superficial, and slower epitheliomata can often be successfully treated by *electrolysis*, by the high tension

¹ The Treatment of Skin Cancers, The International Journal of Surgery, 1907.

spark, by curettage, or by solid carbon dioxide; deeper seated and more extensive lesions require arsenous acid, caustic potash, nitric acid, or the acid nitrate of mercury. In certain locations, the *x*-rays is the treatment of choice, as at the ocular canthi, where destructive action of any kind would lead to extensive deformity and disability. I do not believe that the *x*-ray is to be relied upon as a permanent method of cure; but as these affections often occur in patients of advanced years, and as retrogression of the infiltration and healing over of the ulceration can usually be effected, it is a sufficient treatment even if it has to be repeated at intervals. *Arsenous acid* is the agent which I prefer in most cases; it is the only one that has the selective action referred to above. For a consideration of the details of its employment, I must refer the reader to my work on the subject,¹ since it would be entirely impossible for me to go into them in the space at my disposal here. The *acid nitrate of mercury* method, as developed by Sherwell, shall receive more detailed consideration; both on account of the remarkable success with which its originator has used it, and from its being applicable in cases in which arsenous acid cannot be used.

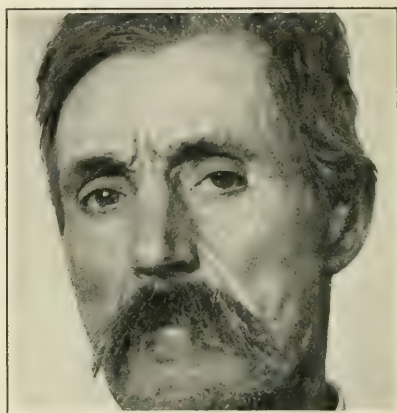
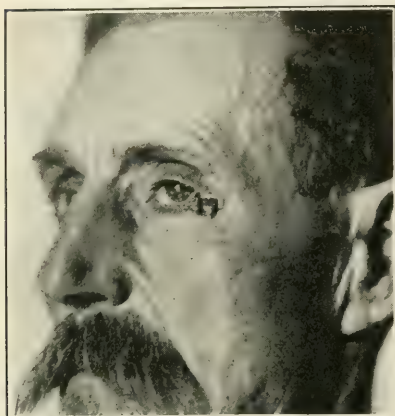
In a recent paper, Sherwell² describes his method; and its success was testified to by members of the American Dermatological Association who had seen his cases at various times. Epitomized, the method is as follows: Under either general or local anesthesia, as the case may require, a thorough curettage of the affected area is done, and Sherwell lays great stress upon the importance of doing this thoroughly, using curettes of various sizes, having a clean wire edge, and not a razor-like sharpness. Considerable force must be used, the softer diseased tissue being much less resistant than the normal structures, and the abnormal cells will be found to extend much further than appears from the outside. The smallest curettes must be employed to get into all the processes and sinuosities of the growth. The oozing is stopped by pressure with gauze sponges wrung out of very hot water or soaked in an adrenalin solution; the Paquelin may be used for any spurters that appear.

These are the preliminary steps, and the patient is now ready for the caustic. The anesthesia, whether local or general, should now be at its height. The acid nitrate of mercury, full 60 per cent. strength, is now thoroughly applied to the surface and every corner of the wound by means of small cotton applicators. The effect on the tissues is immediately apparent; they change color, becoming greyish or greenish, and the deep, far-reaching action of the application is at once apparent. Two, three, or more times the acid is to be applied, and it is to be allowed to act for from five to twenty minutes, according to the conditions. The final step in the operation is the neutralization of the acid. When

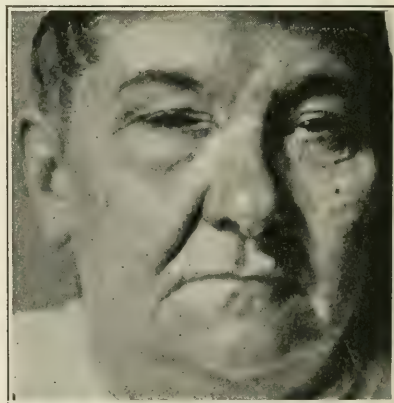
¹ Loc. cit.

² Journal of Cutaneous Diseases, October, 1910.

the wound is dry, powdered sodium bicarbonate is packed into the cavity up to the level of the surrounding skin. This turns yellow from the double decomposition of the sodium and mercury; in a day or two the scab turns black, and when kept dry, as it ought to be, forms a firmly adherent aseptic scab which is cast off in the course of two or three weeks.



FIGS. 11 and 12.—Epithelioma treated with the acid nitrate of mercury.
Sherwell's case.



FIGS. 13 and 14.—Epithelioma treated with the acid nitrate of mercury.
Sherwell's case.

The inflammatory reaction is usually intense, and this Sherwell believes to be beneficial, and I entirely agree with him. The operator with the acid nitrate of mercury applicator in his hand is no better able to judge of the actual limits of the diseased tissue than if he held a knife; it certainly extends farther than he can see. The nitrate shares

with arsenous acid the property of exciting a reactive inflammation in the surrounding tissues of sufficient intensity to cause the less viable new epithelium cells to break down, while the normal cell elements are resistant enough to inflame and recover. I believe it to be less flexible in strength, and therefore less manageable and less selective



FIGS. 15 and 16.—Epithelioma treated with the acid nitrate of mercury.
Sherwell's case.



FIGS. 17 and 18.—Epithelioma treated with the acid nitrate of mercury.
Sherwell's case.

in its action than the arsenic, which I accordingly prefer in most cases; but the nitrate is usable in certain cases in which arsenic is not, as when the newgrowth extends to the margins of the eyelids or to the edge of the mouth. Sherwell's method of protecting the eye when operating in its immediate vicinity is to soak a pledget of cotton of appropriate

size in a saturated solution of sodium bicarbonate, make a firm mass of it by soaking out the redundant moisture, moulding it and holding it in firm apposition to the parts to be protected. This method has been successful in every case. I append four "before and after" photo-prints of Sherwell's cases that bear eloquent testimony to the success of the method. (See Figs. 1, 2, 3, 4, 5, 6, 7, 8, and 9.)

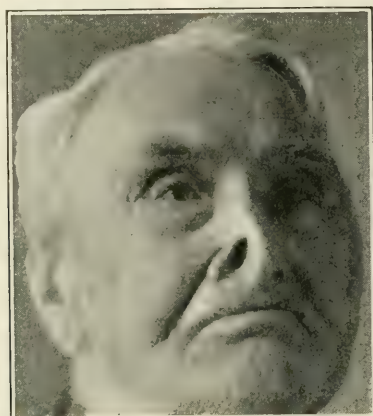


FIG. 19.—End result: Epithelioma treated with the acid nitrate of mercury. Sherwell's case.

Chilblain and Frostbite. Exposure of the extremities of the body in which the circulation is weakest and the fat protection thinnest to alternating cold and heat, especially with moisture, causes chilblain when the noxious agent is intermittent and moderate, and frost bite when it is severe and sustained. Vascular paresis, swelling, itching, and lividity mark the slighter grades of the affection; going on in the severer forms to an intense reactive inflammation which may terminate in gangrene, and be complicated by infection in its various forms and with its various sequelæ. In a recent article,¹ the approved treatment for these common affections has been recapitulated, as follows:

Chilblain: 1. Careful prophylaxis of the extremities and exposed parts, fingers and toes, ears and nose, in debilitated individuals or those who have already suffered from chilblains in the past. Loose but warm coverings; avoidance of cold, and especially of cold and wet, or alternations of cold and warmth.

2. Artificial hyperemia by the Bier method (cups), especially in the more chronic cases. I agree with Ritter² in regarding this as the most valuable therapeutic means at our disposal. Hot air may be tried, but is not so efficacious.

3. Painting with tincture of iodine, or with equal parts of tincture of iodine and tincture of opium, or with oil of peppermint, 1 part;

¹ Journal of the American Medical Association, February 19, 1910.

² Münchener medicinische Wochenschrift, May 7, 1907.

glycerin, 1 to 6 parts; or the inunction of a 10 to 20 per cent. ichthyol-lanolin ointment. I do not like the formalin treatment recommended by Gardiner,¹ since it has an entirely too astringent and hardening action upon the skin.

4. If ulceration has occurred, a white precipitate-ichthyol ointment, 1 per cent. of both drugs in the official unguentum aqua rosæ, does as well as any other combination.

Frostbite: 1. Gradual restoration of the circulation of the frozen part, to diminish as much as possible the intensity of the subsequent inflammatory reaction; cold room, friction of the part with snow or cloths wrung out in cold water, hot tea or coffee internally, but cautiously.

2. Local antiseptic treatment of the part, especially if blisters have formed, or the circulation has been so long and so seriously involved that gangrene occurs. The condition is exactly similar to a burn of corresponding degree. Boric acid wet dressings, linseed oil and lime water, or powders.

3. Gangrene is the indication for amputation, though I have always found it well to wait for some time before advising operation to give the patient time to recover from the shock.

The Treatment of Eczema. The treatment of this commonest and perhaps least understood of all the ordinary skin diseases is still a problem to the practitioner, largely, I cannot but think, from the fact that the diagnosis once made, he is prone to treat it entirely by routine, avoiding certain things and employing others associated in his mind with the name, and entirely without reference to the diseased condition that lies before him. It has not been sufficiently impressed upon him that the extremely varied symptom-complex that we group under the name is an assemblage which we consider as an entity merely on account of convenience, and because of our ignorance of the real nature and etiology of the affection. There can be very little doubt that future developments will resolve this diagnostic entity into a number of separate affections; and, indeed, the process has already commenced. The seborrheal forms of the affection are recognized as differing in etiology, in semiology, and in therapeutics, from the ordinary varieties; and the same may be said of the deeper seated varieties, now classed as dermatitis rather than as true eczematous diseases. But my experience as a teacher leads me to believe that, the general diagnosis once made, the avoidance of water on the one hand and the use of ichthyol ointment or Lassar's paste on the other, constitute the sum total of the therapeutics suggested.

Now, as a matter of fact, there is no affection of the skin that calls for a more careful differentiation of the form of the affection and consequent

¹ Practitioner, February, 1908.

differentiation of the therapeutics to be employed than does this disease. Dyer¹ calls attention to the abuse of "favorite prescriptions" where the widest eclecticism must be exercised. He emphasizes the point that there are many forms of the disease in which a salve or any greasy application does harm rather than good; though he goes too far, in my opinion, when he says that there are few forms of eczema that salves can cure or even help. They are certainly not indicated in the acute eczemas. On the other hand, it is not true, though generally accepted, that water is always harmful in eczema, the harm being due to the added irritation of washing, and especially from the use of improper soap. Hyperemic surfaces need soothing applications, frequently applied. Moist surfaces need desiccants; infected areas require antiseptic dressings; and chronic eczemas should have protective, stimulant, resorbent, or emollient oily applications, in accordance with the conditions present in each individual case. In the latter forms especially, prolonged baths, preferably containing starch, bran, or marshmallow, will greatly facilitate cure. Dyer concludes with a table of indicated treatment which may be useful, and which, with certain alterations, I copy here:

1. Eczema of the hyperemic and papular type: Sedative and astringent applications; calamine and zinc lotions.

2. Eczema of the vesicular type: Desiccant and astringent lotions; lead and opium wash, zinc oxide or magnesium carbonate lotion.

3. Eczema of the moist or weeping type: Protective and antiseptic applications; powders, zinc oxide, bismuth, aristol, etc.

4. Crusted eczema: Moist dressings, antiseptics, permanganate, bichloride, boric acid solutions.

5. Pustular eczemas: Antiseptic, protective applications; bichloride, boric acid solutions.

6. Erythemato-squamous eczema: Resorbent, protective applications, ointment, salicylic acid, 5 per cent.

7. Infiltrated eczema: Resorbent, emollient, stimulant applications; ointments, tar, lead.

8. Chronic infiltrated eczema: Stimulant applications; tar, chrysarobin, plasters, etc.

Bunch² gives some important suggestions for the *treatment of chronic eczema*, that *bête noir* of dermal therapeutics. The chronic edema and thickening of the tissues must be removed before any effect can be gotten from our local applications. Massage is very useful for that purpose, followed by salicylic plasters or ointments, or the tars, and especially the liquor carbonis detergens. Chrysarobin or pyrogallol, in 1 to 10 per cent. ointments of vaseline can be painted on, followed by zinc and starch powder. In the worst cases, 50 per cent. liquor

¹ American Journal of Dermatology, vol. xiv, No. 7.

² Lancet, April 9, 1909.

potassæ or 50 per cent. silver nitrate should be applied, and the part left alone for two weeks; the scab is then removed, and a boric acid ointment used to complete the cure. Lenigallol pastes have done him good service; the following is an example of a suitable formula: Lenigallol, 40 grains; oil of cade, 20 minims; zinc oxide, $1\frac{1}{2}$ drams; kaolin, $1\frac{1}{2}$ drams; vaselin, 1 ounce. For eczema of the anus, scrotum, and vulvæ, so notoriously obstinate, Bunch recommends the Paquelin cautery, under either local or general anesthesia. His advocacy of radium in this condition must be looked upon as a purely academic contribution to the therapy of the affection, for the agent is not within the reach of the ordinary specialist, much less the general practitioner. For the itching, the symptom most troublesome to the patient, as well as to his physician, Bunch advises the usual 2 per cent. menthol in alcohol or oil, 1 to 2 per cent. salicylic alcohol, carbolic acid, and glycerin, as well as cocaine or eucaine solutions, and also internal and dietetic treatment.

Brocq¹ voices the opinion of many dermatologists when he lauds crude coal tar as the best of siccatives and antipruritics in eczematous conditions. The crusts are removed, and the affected surface is washed with sterile water and sponged with ether. The tar is then applied in a thick layer, allowed to dry as long as possible (several hours), then covered with powdered talcum, and bandaged. If the tar irritates, and there is much inflammation and oozing on the day following its application, a mild zinc paste or ointment must be employed for several days. The tar is reapplied about once in five days, and three to five treatments generally suffice to effect a cure.

Southerland² calls attention to the harm done by the administration of arsenic in eczemas of all the acuter varieties. His experience was gained in India and the tropics generally, and will be found useful in the warmer portions of the United States. Water must be avoided, even for cleansing purposes, and diluted alcohol or warm olive oil substituted for it. I would add milk to the list of cleansing agents; it is alkaline, bland, and effective, and I employ it extensively. Sweating, especially in the eczemas of the genitals and axillæ, is an important factor in keeping up the irritation of the skin and retarding a cure; it must be combatted by the various dusting powders, which, in locations where it is difficult or inadvisable to have dressings, may be put in a small thin gauze bag, and kept in place, so that each movement of the body deposits some of it on the surface of the skin. He greatly favors the use of the liquor alumini acetici of the German Pharmacopœia, made according to the new formula without lead. In last year's review³ will be found an account of the disastrous consequences of a careless

¹ American Journal of the American Sciences, August, 1910.

² Journal of the Royal Army Medical Corps, September, 1910.

³ PROGRESSIVE MEDICINE, September, 1910, p. 107.

employment of the latter preparation. Hardly finds that in the tropics, and it holds good in the summer months in our own climate, that all salves, more especially in the treatment of pyemia, must be eschewed as of the evil one's invention. The epidemics is overlaid with fluid and seethes as it is, and does not tolerate oily material at all. Reliance must be placed upon powders and lotions; and he suggests a cream that smokes are very favourably, not only as regards its own special composition, but as a base with which may be incorporated any other drug.



FIG. 25.—Epidemic pyemia. (inspired by recent bulletin on skin and cuts. K. M. and S. M.)

salicylic acid, being used in any of the cases that may be referred. It is prepared thus: Zinc oxide, 40 grs.; pure glycerine, 40 c.c.; rose water 140 c.c. Mix and shake thoroughly; let the mixture stand three days, decant the supernatant fluid, and use the remaining powder. The three days' wait could be a moral part of the people that would hardly find fever with us; and I would suggest that the rose water be diminished to 40 or even 20 c.c. in the above, and the mixture compounded in a mortar instead of by shaking. In fact, by varying the

above proportions, a cream of any consistency can be made, but care must be taken of two points. The trituration must be thorough, so that no particles of zinc or other solid ingredients remain of sufficient size to prove irritating, and a certain amount of water must be added to the glycerin, which in its pure state is liable to be very irritating.

Epidermolysis Bullosa. Reference was last made to this unusual affection five years ago.¹ Kanoky and Sutton² have recently published and pictured an interesting instance of the disease; the patient was a female, aged three years, and the lesions of the disease had appeared at times from her second day of life. No part of the skin and visible



FIG. 21.—Nail atrophy—epidermolysis bullosa. (Kanoky and Sutton.)

mucosa was exempt; the slightest traumatism or irritation anywhere, even the friction of a rough towel, caused the formation of one or more blebs of varying size, with serous or hemorrhagic contents. Healing under any protective application was rapid; the general health was good, and except for the liability to the formation of the bullæ under the slightest irritation, the child was normal. The mucosa of the mouth had been frequently affected, probably in consequence of slight accidental injuries in eating (Figs. 20 and 21.)

As has been shown by Pusey,³ Engman and Mook,⁴ and others, this extreme susceptibility of the skin and mucous membranes to

¹ *PROGRESSIVE MEDICINE*, September, 1906, p. 108.

² *Journal of the American Medical Association*, April 2, 1910.

³ *Principles and Practice of Dermatology*, 1907, p. 23.

⁴ *Journal of Cutaneous Diseases*, 1906, p. 55.

injury is due to a developmental abnormality. The elastic tissue is almost entirely absent in the upper corium; and there is an especially noticeable absence of the tissue in the boundary region between the two main layers of the skin. Of course, there is no treatment for the condition; our efforts are limited to treating the lesions that appear, and ordering such measures as may tend to help the patient avoid accidental injuries of the hypersensitive integument. Most of these cases have been hereditary, as their nature would lead us to presuppose.

Gonorrheal Affections of the Skin and its Appendages. The gonococcus is, as a rule, strictly localized in its habitat. The urethra, and its adjacent passages, and the bladder are its usual seat. That the conjunctival mucosa may occasionally be suitable for its growth is universally known, though its susceptibility must be comparatively slight, or gonorrheal ophthalmia would be commoner than it is among the hundreds of thousands of careless and dirty gonorrheics. Still less susceptible are the buccal and rectal mucosæ, the latter being practically always directly exposed to contagion in the female, and both being undoubtedly frequently exposed from the various unnatural modes of sexual congress that are not uncommon in our cities; yet buccal and rectal gonorrhea, though known, are great rarities. That the skin is susceptible to the contagion is a fact that will be new, I think, to most of us, yet undoubted cases of the kind are on record.

Rosenthal¹ reports a case in which a general polymorphous exanthem was proved to be due to infection of the skin with the gonococcus. A case of gonorrheal keratosis is described by Williams;² like the others of the same character, it occurred in a case of general gonococcal septicemia. The feet only were affected, and the affection differed from keratosis of the ordinary type in that the hardened masses extended onto the sides of the feet and the dorsum of the toes. Gonococci were not demonstrated microscopically; yet the etiology of the case does not seem doubtful, since there are a number of cases on record, all occurring in connection with severe systemic gonorrheal infections. In fact, among the 6 cases recorded by Le Damany³ several years ago, some had recurrent hyperkeratotic lesions, with fresh attacks of gonorrhea. In the instances recorded by Roth,⁴ among others, there was the same failure by Williams to demonstrate the parasite. Fleissinger⁵ has collected no less than 16 cases of gonorrheal keratosis, and later ones have been recorded by Sequeira.⁶ A remarkable case of the kind is recorded and pictured by Chauffard,⁷ who also gives a review of all

¹ Archiv für Dermatologie und Syphilis, March, 1910, p. 105.

² British Journal of Dermatology, December, 1910, p. 369.

³ Ibid., vol. x, p. 35.

⁴ Ibid., vol. xviii, p. 156.

⁵ Journal des praticiens, September 25, 1909.

⁶ British Journal of Dermatology, vol. xxii, p. 139.

⁷ Ikonographia Dermatologica, Fasc. v, 1910.

the instances recorded up to date. Robin and Fleissinger¹ quite recently have reported a seventeenth case. Finally, a remarkable case of gonorrheal folliculitis affecting the hair has been noted by Wright.²

The Treatment of Hypertrichosis. Hypertrichosis in the female is a deformity of consequence when it is at all extensive; and in bad cases in patients who are not willing to exhibit themselves as "bearded ladies," it is a serious misfortune. It frequently leads to melancholia with all its attendant evils, and it has been known to be the cause of suicide. It is improper, therefore, as it is in acne, to dismiss the patient with a trivial remedy or with a joke; they are suffering from a real trouble, which under certain circumstances may amount to a true misfortune. The last mentioned of this affection in these pages was made a number of years ago,³ at which time electric epilation or "needling," as the patients call it, was the only radical remedy at our disposal. It is still the one which is most generally available, since the apparatus required is cheap and readily obtained. Unfortunately, the same cannot be said of the experience which is necessary. Nothing but practice will give the skill required to do electric epilation successfully, with a minimum of discomfort, and without resultant deformity. The beginner will do well to try his prentice hand upon unimportant and not extensive cases, where the hairs are few and large, before attempting important and more serious cases. For the details of the process the reader is referred to the volumes of *PROGRESSIVE MEDICINE* above mentioned. A few minor improvements in technique may be mentioned:

Kromayer⁴ recommends varnishing the shaft of the needle all but the point; the whole needle is dipped into shellac or other varnish, and after it is dried, the material is scraped off the extreme point. This insulates the shaft, prevents the current acting on the upper layers of the skin, and confines its effect to the point where it is wanted. This insulation of the needle shaft is undoubtedly desirable, since with the unvarnished instrument some of the electrolytic effect is indubitably expended on the upper parts of the hair shaft with the walls of which the needle is in contact; but I do not believe Kromayer's claim that by thus making the electrolysis entirely subcutaneous all chances of excessive destruction of tissue and consequent deformity is avoided. This latter is occasioned entirely by general faults of technique, too strong currents, careless introduction of the needle through the skin and not along the channel of the hair follicle, too much electrolytic

¹ Bulletin de la Société Française de Dermatologie et de Syphilographie, March, 1911, p. 97.

² Journal of the American Medical Association, July 19, 1909, p. 1996.

³ *PROGRESSIVE MEDICINE*, September, 1901, p. 171; September, 1902, p. 173; September, 1904, p. 121.

⁴ Monatshefte für praktische Dermatologie, April 15, 1909, p. 393.

action over a limited area, etc. Kromayer uses several needles at once, all attached to a single battery terminal; an arrangement for that purpose is obtainable here, consisting of four very light needle clips on one stem. All four needles may be introduced and allowed to remain in place while the current is on. The time consumed in this tedious process may thus be appreciably shortened. The needles, however, must be extremely short and light, or they will fall out of the follicle from their own weight; and considerably dexterity is required to keep them all in place in sufficiently separated locations at one and the same time.

Pirie¹ suggests the employment of a flexible wire instead of the rigid broach, shellacing it as advised by Kromayer; it is impossible to puncture the skin, and the instrument must perforce be passed as it should be, along the sebaceous passage. He uses the wire stiletts of the hypodermic needles for the purpose, and claims that not only are there no false passages and no scars, but there is less return of the hair by this method. I have not used it, but think the suggestion may be good, provided the flexible wire can be readily introduced.

When the *x-ray treatment* was first introduced, falling of the hair was soon noticed as one of the results of its application; and it was felt that the substitution of a rapid and painless method of removing hair in the place of the extremely tedious "needling" was an important advance in dermaltherapeutics. True, the hair usually returned after the first removal; but a second one was generally permanent, and only in rare instances was a third course necessary. But accidents soon began to occur. The ray was recklessly used, with powerful currents and large tubes, and the ill results became apparent not only on the patients, but also, unfortunately, on the pioneer investigators. Radiodermatitis, with resultant permanent atrophy of the tissues and sometimes most intractable ulceration, occurred; damage suits were instituted on the basis of this untoward result of a procedure designed to remove what after all was merely a disfigurement; and a number of the operators suffered permanent injury and even death from their incautious self-exposure to the rays. In consequence of this, the pendulum gradually swung to the other extreme, and radiotherapeusis fell into disrepute as a remedy for hypertrichosis. Most operators reject it entirely today; and I have myself taken this standpoint in the past. Even *x-ray epilation* in extensive ringworm and favus, though so largely, persistently, and successfully employed in Europe, and especially in Paris, has not gained much acceptance here. The results attained cannot be called satisfactory; extensive ulceration, atrophy, and scar tissue formation being hardly an improvement on the original disease.

I still hold these same views in a general way; but I have had reason of late to modify them in some respects. I still believe that hyper-

¹ Lancet, 1909, p. 1752.

trichosis should not be treated with the ray by the ordinary operator and with the usual tube. That there is no easy and reliable way of measuring the strength of the ray is admitted; all the various methods used are imperfect and liable to mislead. The ordinary large and powerful bulb tube is admirable for radiodiagnosis, for fluoroscopy and negative making; but it is a dangerous instrument for therapy. There are a few men, however, who by constant practice attain such a degree of skill in its use that they can employ it with safety even for this purpose. Thus, I have seen MacKee at the Manhattan Dermatological Society show cases, both of ringworm and hypertrichosis, that had been epilated with this instrument by the single large dose method, and without damage. Complete depilation was effected by one or a few treatments, the dosage being kept just within the danger line. It is given to but few of us, however, to attain such skill; and it requires some hardihood even for those who have acquired it, to use a remedy the least overdose of which may be accompanied by such disastrous consequences.

Within the last few years, however, a method of using the x -rays therapeutically with safety in the limited number of cases in which it is indicated has been perfected. I refer to the so-called Cornell or contact tube, devised by Geyser of this city. It would be out of place here to discuss the theory of its action, or to attempt to decide whether the absence of damage from its use is due to the fact that, being held in direct contact with the tissue to be treated, the absence of air between the window and the skin, or the grounding of the tube through the patient's body, as Geyser holds, is the cause of its safety; or whether, as others think, the contact tube is safer than the ordinary ones because of the small area of the target and the small amount of ray produced. Therapeutic effects can be gotten from it, though slowly, and an experience of several years, during which I have used this instrument quite extensively in suitable cases, leads me to say with considerable assurance that no damage results from its use. Its inventor claims that radiodermatitis cannot be caused by it; I doubt this statement, but I agree with him in his assertion that many of the so-called x -ray erythemas and dermatites are really thermic in the origin, and are caused by allowing the interruptions to become too rapid and the tube to get too hot.

This tube can be used for the cure of hypertrichosis, the interruptions being kept slow enough to prevent its getting hot. It should not be kept too long in one place; three to five minutes is enough; and when the whole cheek or face is affected, the patient should slowly move the tube from place to place during the entire sitting. This sitting, in an extensive case, should be from twenty minutes to half an hour, and the treatment should be given once or twice a week. Several months may be required, and one falling is not sufficient; the hair usually reappears, and must be removed a second time. The depilation

is then permanent. I have not personally as yet had an opportunity to use the treatment on an extensive case; but I have seen more than one of Geyser's, and have examined and spoken to the patients. The results were certainly remarkable; practically complete absence of hair, and with a perfectly normal and unmarked skin. The only exception to this was a very slight and superficial scar near the ear in one case, which was due to an accidental thermic burn. The patients expressed themselves as perfectly satisfied with the results; one of them who had been under treatment a year, and was cured, still came for treatment, probably with some vague idea of prophylaxis of a possible future growth in her mind.

Lichen Planus. This subject has not been reviewed in these pages since 1907,¹ when its mouth manifestations were considered. It is of importance to the general practitioner, inasmuch as it is a fairly common disease, and an extremely obstinate one; and for the further reason that it often looks, to the inexperienced eye, very much like an eczema, and prognosis and therapeusis based upon that diagnosis leads only to disappointment. The differentiation, however, in the great majority of cases, is very easy, for lichen planus has a definite and characteristic dermal lesion, the recognition of which at once removes all doubt as to the character of the disease. That lesion is a pinhead sized, quadrangular or angular, flat topped, slightly scaly, purple papule, lasting for weeks, and intensely itchy. It is entirely different from the acuminate, bright red, inflammatory, and evanescent papule of eczema; and no matter how large the lichen papules grow, or how extensive the area that may be covered by conglomerate patches of the lesions, they always preserve the essential characters above given, and at the margins, or in new patches, perfectly typical smaller lesions will be seen.

The main source of error in the diagnosis, however, arises from a fact that has not been sufficiently dwelt upon in the literature; and that is that any retrogressing papular inflammatory lesion, and especially an eczematous papule at a certain stage of involution, will to some extent resemble a lichen planus papule. In its last stages it appears as a flat topped lesion; but it is dusky pink in color, rounded in its outline, and of short duration. Larger eczematous patches in their most chronic form, often present a quadrillation of their surface that so resembles a lichen aggregation that the term "lichenification" is applied to it; but the absence of the purple color, and of characteristic isolated lesions at the margins, together with the almost certain presence elsewhere of characteristic eczematous appearances, readily prevents error. The chief source of this latter is, of course, the fact that both affections are intensely pruriginous.

Error in the diagnosis leads to an erroneous prognosis and faulty treatment. Lichen planus is a very obstinate and lasting disease,

¹ PROGRESSIVE MEDICINE, September, 1907, p. 115.

even under the best treatment; it lasts many months, and the patient had better be informed of that fact. An eczema ought only to last a few weeks at the most. Wet applications, so efficient in the early stages of eczema, and the ordinary ointments containing zinc, salicylic acid, tar, etc., appropriate to the later stages, do no good in lichen planus. In this latter disease, also, internal treatment is of prime importance; it is of very subsidiary usefulness in eczema.

Montgomery and Alderson¹ hold, as the result of their studies, that lichen planus is a constitutional disease with manifestations on the skin and mucosæ. The general symptoms, however, are not marked, save in exceptionally acute cases; and hence they are usually overlooked. In the acute case that these authors studied carefully, the temperature at times rose to 38.5° C., and there were marked general symptoms. I have noted the same myself in some very generalized cases. There are other things, however, that tend to show its constitutional character. The eruption may appear anywhere on the skin or visible mucosæ; and there is no reason to believe that it does not appear on those of the latter not accessible to investigation. In a person suffering from an attack of the disease, the eruption may be made to appear anywhere by irritation, a fact that I frequently take advantage of for diagnostic or demonstrative purposes, making a pin scratch on the skin anywhere on the body, and finding it forty-eight hours later replaced by a row of characteristic lichen papules. The peculiar susceptibility of these patients to pneumonia has long ago been noted by Schutz.² Disturbance of the alimentary canal is too slight to be noticed in the ordinary chronic cases; but in acuter ones there is a coated tongue, sluggish bowels, anorexia, etc. The success achieved by the use of antifermentative drugs, arsenic, bichloride of mercury, the salicylates, etc., would tend to show that the disease is probably a toxemia from the gastrointestinal canal.

Engman and Mook³ also consider the affection a general systemic disease, and recount the histories of four cases occurring in two families. Morel-Lavallée has reported 2 cases in husband and wife; Beltmann describes 2 occurring in a brother and sister; and other instances in which there were 2 or more cases in one family have been reported by Jadassohn, Keyes, Hamacker, Lustgarten, Ledermann, Heidingsfeld, and others. Kinch⁴ notes that the statistics of the American Dermatological Association place the frequency of the disease at about 50 per 10,000 of all skin diseases, smaller, I think, than experience would lead us to expect.

The *treatment* of the disease must be both internal and external.

¹ Section on Dermatology, American Medical Association, June, 1907.

² Archiv für Dermatologie und Syphilis, vol. xli, p. 255.

³ Interstate Medical Journal, June, 1909.

⁴ New York Medical Journal, July 30, 1910.

Pruritus, always marked, may be so intense and so disturbing that it forms a very serious element in the disease. The various local antipruritics, menthol, carbolic acid, salol, thymol, and chloral, may be tried; but only too often they are ineffective. Nothing has given me such good results for this distressing symptom as *Unna's lichen ointment*, the formula of which is as follows: Sublimite, 0.2 gm.; carbolic acid, 4 gm.; petrolatum, 90 gm. I can heartily recommend it, and can say that I have never seen any ill effects from it even when used over very extensive surfaces of the body. For the internal treatment I have gradually come down to three drugs only, which I have found to be efficacious in the order named. *Arsenic*, preferably administered hypodermically every day, or every other day, in doses gradually increasing up to tolerance. I use a 1 per cent. sodium arsenate solution, beginning with 5 drops and increasing a drop at a dose; the *salicylates* in doses as large as can be borne; and finally, *mercury*, either the bichloride administered hypodermically like the arsenic, or the protiodide by mouth.

Maculæ Cerulæ. These peculiar bluish-gray, lentil to nail-sized, rounded or oval spots, most often seen on the skin of subaxillary or lumbar regions, occur as a phenomenon of pediculosis only in predisposed individuals; and they may outlast the presence of the parasites for several weeks. Their origin is still a matter of doubt, though their dependence on the parasitic disease is indubitable. Damaschino-Duguet¹ found no demonstrable pigment either in the epidermis or the corium; and Tiesche² also failed, though he believes the discoloration to be due to blood coloring matter in too minute a form to be recognizable in the deeper layers of the cutis. Oppenheim³ claims to have observed a greenish diffuse coloration of all the layers of the skin; this he regards as derived from the human blood pigment, which in the body of the pediculus itself is turned into a peculiar green pigment. Pellier,⁴ on the other hand, has found certain greenish colored cells in the louse body, though he does not explain how and in what form it is deposited in the skin. Most authorities, however, still regard the appearance as a true toxic erythema, occasioned by inoculations by the bites of the parasite. If the latter be the case, however, it is peculiar that comparatively few individuals are susceptible, and that the eruption is always localized to the regions above mentioned. The exact nature of these spots is still a matter of doubt.

Parapsoriasis. This term, provisionally introduced by Brocq, in 1902, has gained continuously increasing acceptance; it is met with everywhere today as the name of a not uncommon class of dermatoses

¹ Jarisch, Die Hautkrankheiten, p. 633.

² Archiv für Dermatologie und Syphilis, vol. xci.

³ Ibid., May, 1909, p. 73.

⁴ Monatshefte für praktische Dermatologie, January 15, 1909, p. 56.

that resemble some common affections, and yet differ from them both in symptomatology and in the remedies that are effective in their treatment. Every practitioner has met cases which look at one time or in one part like eczema, or like psoriasis, or like a seborrhea; and has experienced the difficulty in giving the affection a name and in deciding on the treatment to be employed. The patients in question show an eruption composed of erythematous and scaly patches, non-pruriginous, and extremely persistent and rebellious to treatment. They resemble psoriasis more than any other of the common dermatoses, but differ from the plaques of that disease in that their scales are not heaped up and silvery, but rather scanty and fatty; that the psoriatic points of predilection, the elbows and knees, are usually free, and that they do not respond to the usual antipsoriatic treatment. On the other hand, they show neither the pruritus, the exudation, or the location and mode of spread of eczema; and from seborrhea they differ in location and appearance markedly. Realizing that these border-line cases occur, we formerly designated them seborrheal psoriasis, or psoriasiform eczemas. It seems better, since we are ignorant of the etiology of all these diseases and our classification of them is still a purely objective one, to reserve a special name for a series of cases that have a different symptomatology and therapeusis.

Parapsoriasis appears in three distinct forms. Parapsoriasis guttata appears as faintly rosy or reddish-brown lenticular spots on the trunk and limbs, covered with some dry adherent scales, but not elevated or infiltrated, not showing the fine branny and silver scaling of psoriasis, and not located on the psoriatic areas. Lichenoid parapsoriasis has similar, but smaller and more papular lesions, sometimes depressed or atrophic in their centres, and scattered singly or in groups over the trunk and members. The differential diagnosis is from lichen planus, lichen scrofulosorum, a papular syphiloderm, and a guttate psoriasis. It seems probable that the cases reported at various times by Unna, Jadassohn, Neisser, Pinkus, Crocker, etc., under such confusing designations as parakeratosi variegata, lichen psoriasis, pityriasis lichenoides chronica, etc., should be ranged under these first two forms. Finally, parapsoriasis in plaques, more or less extended patches, yellowish or pinkish, with very little scaling, and rounded or oval in form, seated on the trunk or limbs, and more or less marked with the quadrillation known as lichenification. This form of the disease is likely to be mistaken for eczema, or even for a tertiary syphilis; and it also has been baptized with various complicated names, the recital of which need not detain us. The duration of the disease is indefinite, though individual lesions retrogress and new ones take their place.

Verrotti¹ claims that the affection is really a tuberculide, though no tubercle bacilli have ever been demonstrated; he bases his claim on the

¹ Archiv für Dermatologie, June, 1909, p. 203.

presence of the tuberculid triad, giant cells, epithelioid cells, and lymphocytes. Darier agrees with Civatte in sustaining this opinion.¹ Corlett,² in a very exhaustive study of the subject, with excellent illustrations, concludes that the histological changes are sufficiently distinctive to warrant us in placing the disease in a category by itself. But little is said of the treatment of the affection, though all authorities agree as to its obstinacy. Perhaps the most likely to be useful is the suggestion of Audry,³ who advises cacodylate of soda injections (0.05 to 0.25), which seems to have influenced some of his cases favorably. Locally, he advises a pyrogallol-salicylic ointment: Pyrogallol, 2 gm.; lanolin, lard, of each, 20 gm.; salicylic acid, 0.5 gm.

Rosacea. Few affections of the skin are more troublesome to the practitioner than this chronic and deforming disease, whether in its earliest form of a diffuse redness and flushing of the nose and the central parts of the face, its later stage with dilatation of the bloodvessels and sebaceous gland infections, or its final and happily rare result of hypertrophy and deformity of the nose. The dependence of this condition upon gastro-intestinal irritation is well known; and as one of the commonest causes of this latter condition is habitual over-indulgence in alcoholic liquors, in the minds of the laity a red face or a red nose is a proof positive of bad habits. Yet in many cases the cause is an entirely different one. Chronic gastric trouble arises from a variety of causes; and the extremely proper elderly spinster, who keeps her tea kettle on the fire all day long, or the brainworker who resorts to coffee as a stimulus to his flagging mental energies, are but too often accused of secret tippling. Besides this, there are external causes for the affection entirely unconnected with the gastro-intestinal one. Cab drivers, policemen, and others whose occupations expose them to wind and weather, suffer from rosacea; though in these cases it must be admitted that in very many instances both the internal and the external etiological factors are active in the causation of the disease. Entirely apart from the discomfort and misconception occasioned by the deformity, it has sociological aspects of importance. I have met with many cases in which employment was gotten with difficulty and an individual's whole career hampered by a bad rosacea and acne.

It is often forgotten, however, that rosacea is essentially an affection of the bloodvessels of the face, and that though it is frequently accompanied by acne, this is not necessarily the case. The text-books are to some extent responsible for this confusion; even so recent a one as that of Schamberg⁴ still labelling the affection acne rosacea. Certainly the great majority of acne cases have no rosacea, and many rosaceas

¹ *Precis de Dermatologie*, Paris, 1909, p. 95.

² *Journal of Cutaneous Diseases*, February, 1909.

³ *Traitement des Maladies Cutanées et Vénériennes*, Paris, 1909, p. 157.

⁴ *Diseases of the Skin*, 1908, p. 119.

have no acne. Of course, in a well-developed rosacea the excess of arterial blood in the face leads to hyperdevelopment of the sebaceous glands, and consequently to their greater liability to pus infections.

The *treatment* of the affection depends largely upon the stage that it is in; in all cases, however, the underlying cause must be ascertained, and as far as possible remedied. The diet and bowels must be regulated, tea, coffee, liquors, tobacco, etc., cut off, and the proper treatment for the form of dyspepsia, which may be present instituted. Ichthyol internally, in doses of one or two grains after meals, often does good. Sulphur is our chief reliance in the early cases with diffuse and perhaps transitory redness of the nose or face. It is best used in the form of a lotion; a favorite recipe with me is the following: Sulphur præcipitata, 1 to 3 drams; glycerin, 1 dram; aqua cologniensis, aqua destillata, of each, 3 ounces. In the stage of capillary dilatation, the vessels must be destroyed mechanically. This may be done either by slitting them up longitudinally with an iridectomy knife, using negative galvanic electricity on them as is done in the treatment of hypertrichosis, employing the microbrenner of Unna, or a very fine Paquelin; or, finally, cross-hatching the vessels with a round-bellied knife as the artist does in a pencil drawing. When connective tissue hypertrophy or rhimophyma has occurred, operative ablation must be undertaken.

Two new suggestions have been made recently to help us in the treatment of these troublesome conditions. Zeissl¹ paints on the pure *tincture of the chloride of iron* night and morning; by about the fifth day a thick crust has formed, and there is considerable inflammatory reaction of the underlying skin. The applications are then stopped, and Wilkinson's or the ordinary sulphur ointment used until the inflammation has disappeared. Then another course of the iron chloride is given as before. Zeissl claims that the vessels disappear, leaving the skin pale and smooth. Rothmann² treated several cases with 1 to 1000 *adrenalin hydrochloride* internally, giving 5 drops three times a day in a teaspoonful of water before meals. This was continued for a number of months with occasional interruptions of one or two weeks. The erythemas disappeared almost entirely, and had not reappeared eighteen months later. Regarding the first method, I have had no experience at all; but it is a harmless procedure, and may be tried. I have seen apparent good results from the adrenalin, though I always employ it guarded with strychnine, and in conjunction with some of the local measures recommended above. In fact, a wise eclecticism, using local measures of one kind or another in accordance with the special indications of the case, together with internal and dietetic measures, is indicated here as in so many other dermal affections. Nowhere is

¹ Münchener medicinische Wochenschrift, 1908, No. 28.

² Lancet, January 16, 1909.

a standard remedy more to be deprecated, or a prescription "good for" the disease more out of place.

Sporotrichosis. Some thirteen years ago, Schenck¹ first detected sporotrichia in some small refractory ulcerations appearing along the lymphatics of the forearm, and apparently secondary to an ulceration of the index finger. The lesions on the arm resulted from the breaking down of some small subcutaneous indurations. Cultures from them showed the presence of sporotrichia, a hyphomycetic fungus which grew readily in all the usual media. Schenck succeeded in producing skin lesions of a similar character in dogs by the subcutaneous injection of the fungus; and by injecting it into mice he produced a general infection with especially well-marked lymphatic gland involvement. These findings were subsequently confirmed by various American and especially by the French observers; among whom De Beuermann deserves mention on account of the many cases and investigation reports that he has published. In fact, the parasite itself is generally called sporotrichon Beuermanni on the Continent, instead of bearing its proper designation, sporotrichon Schenckii.

Cases showing the extent, severity, and relative commonness of the disease were soon recorded. Gougerot and Vaucher demonstrated a sporotrichial osteomyelitis greatly resembling a syphilitic or tubercular affection of the tibia, with nodular periosteal thickenings. They found the parasite very difficult to find microscopically in the lesions; on the other hand, cultures were very readily made on the ordinary media, and at room temperatures. Widal and Weil² found that the fungus spores agglutinated when mixed with the patient's serum in dilutions of from 1 to 200 to 1 to 1500, and have recorded a complement deviation phenomenon similar to that of Wassermann; Josset-Moure³ has employed this diagnostic test in a bone case with success, but it is evidently not suited for general use.

Most of the cases so far studied have come from France; but quite a number of cases have been reported here, and, as Pusey⁴ suggests, it is probably more frequent than statistics would indicate. The lesions often resemble those of tertiary syphilis, and they yield readily to the ordinary remedies employed in that affection. In other cases, the phenomena resemble tuberculosis of the skin. Mistaken diagnosis in both directions probably occurs.

The affection always begins in a traumatic lesion of some exposed part of the body, usually of the hand, forearm, foot, or leg; then there develop one or more sharply circumscribed, painless cutaneous or subcutaneous abscesses along the course of the limb, without any of the

¹ Bulletin of the Johns Hopkins Hospital, 1898, p. 286.

² Bulletin de la Société médicale des Hôpitaux de Paris, 1908, p. 944.

³ Archiv für Dermatologie und Syphilis, February, 1909.

⁴ Journal of Cutaneous Diseases, vol. xxviii, p. 352.

symptoms of an ordinary streptococcic cellulitis. Sometimes this assumes the warty appearance of a tuberculosis verrucosa; at others, it appears as gummatous-like ulcerations. Sutton,¹ who has recorded more cases and done more work on the subject than any other American writer, calls attention to the fact that the microscopic examination of the abscess contents is usually negative, but that the organism multiplies readily on agar and other simple culture media. The disease is commoner in the country than in cities; because the sporothrix thrives best on vegetable matter, and slight wounds are liable to become infected.



FIG. 22.—Sporotrichosis lesion. (Sutton's case.)

Sometimes the pus cavities may be very large, as in Dor's case.² The mucosæ seem to be rarely affected, though cases of that kind have been reported by De Bueremann and Gougerot,³ and Leutlle.⁴ Visceral infection has been noted by Massary, Doury,⁵ and Monier-Vinard.⁵ Widal and Weill⁶ have found the parasite in the blood. An external lesion as a point of entrance does not seem to be absolutely necessary for the parasite, for De Beuermann found it in a tonsillar

¹ Journal of the American Medical Association, September 17, 1910; *ibid.*, December 24, 1910; *ibid.*, May 6, 1911, etc.

² Presse médicale, 1906, No. 30, p. 234.

³ Bulletin de la Société des Hôpitaux de Paris, 1907, p. 585.

⁴ Presse médicale, 1908, No. 23, p. 182.

⁵ Bulletin de la Société médicale des Hôpitaux de Paris, 1907, p. 476.

⁶ *Ibid.*, 1908, p. 944.



FIG. 23.—Sporotrichosis. (Sutton's case.)

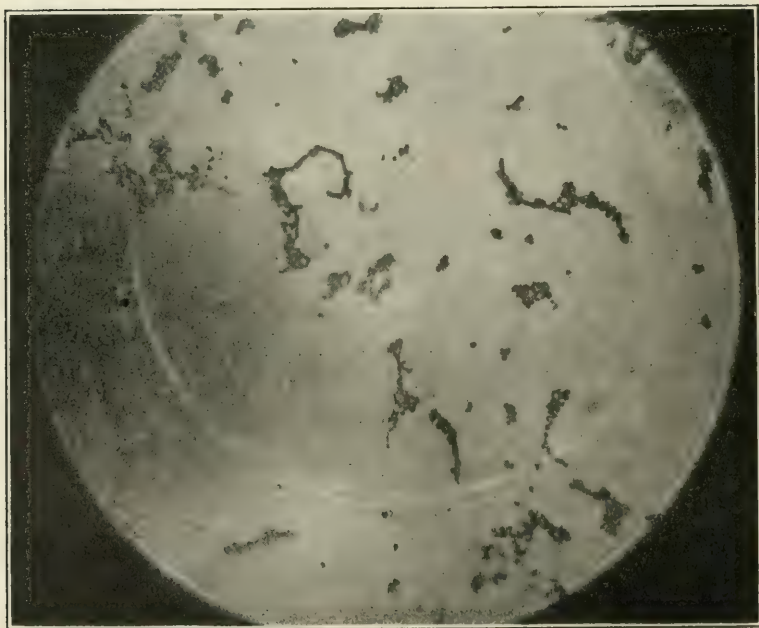


FIG. 24.—Sporotrichosis parasite. (Sutton's case.)

crypt in one of his cases, and he inoculated a guinea-pig by feeding it with milk containing cultures of the sporothrix.

The most appropriate treatment has been found to be incision, mild cauterization of the cavity, as with carbolic acid, and wet dressings, with iodide of potassium internally. I append reproductions of some excellent photographs of a recent case of Sutton's, together with a photomicrograph of the organism from the same source. (See Figs. 22, 23, and 24.)

Venesection and Saline Infusion in Skin Diseases. More than fourteen years ago Schubert¹ employed venesection as an aid to the cure of certain obstinate and relapsing dermal affections, including eczema, psoriasis, and furunculosis. He reported a number of cures, finding a most marked effect in furunculosis; and he ascribed the good results to the removal of leukocytes by the blood abstraction. Dyes at the same time recounted the history of a female patient, who had suffered from a general moist eczema for thirteen years, and upon whom every kind of treatment had been tried in vain. After the first venesection, the eczema dried up, and four weeks after the third venesection the patient was cured.

There is a general feeling of scepticism in dermatological circles as regards the histories of patients with ordinarily curable diseases which are recorded as "rebellious to every treatment," the chances being that the record should read "to every treatment employed," and venesection has long been unpopular and practically unknown as a therapeutic measure. It is probably for these reasons that very little notice was taken of Schubert's researches, and no attempts were made to repeat his experiments.

Quite recently Bruck² has treated 8 patients suffering from various skin affections by the method, withdrawing about 250 c.c. of blood, and following this by the intravenous infusion of about 500 c.c. of physiological salt solution. Acting on the supposition that various dermatoses of unknown etiology were probably due to the presence of toxins in the blood, his endeavor was to remove these, in part at least. This "lavage of the blood" not only washes out toxins but stimulates the blood-producing organs. While Bruck does not record any remarkable cures, he notes favorable effects in generalized pruritus, urticaria, erythema multiforme, and dermatitis herpetiformis; no effect was observed in psoriasis and eczema. I have had no experience myself with the method; the standard modes of treatment have been quite sufficient for such affections as pruritus, urticaria, and erythema multiforme. But in diseases like dermatitis herpetiformis, which relapse persistently in spite of all our efforts, it might well be tried in conjunction with other treatment.

¹ Berliner klinische Wochenschrift, 1907, No. 16.

² Ibid., January 16, 1911.

SYPHILIS

Arsenobenzol (606). During the past twelve months the attention not of syphilographers alone, but of the whole medical world, and unfortunately that of very many laymen also, has been directed to the new syphilis remedy proposed by Ehrlich. So extravagant have been the claims made for it, and so general has been the interest which it has excited, that, to take my own experience as an example, every paper which I have been asked to read, and every discussion that I have been invited to take part in this winter has been on that subject. This has been to some extent natural, since syphilis is of such prevalence and its effects are so multiform, that specialists in every branch of medicine as well as every general practitioner, have been intensely interested in the drug. The medical journals have been literally flooded with articles on the subject; I attempted to keep track of them at first, but when the number reached, as it has done, over 250 papers, I gave it up. It is true that the great majority of these papers were by non-experts, by writers unacquainted, save in a general way, with the disease, and unfamiliar with its modern treatment; and very many of them were mere rehashes of the previous literature, or accounts of what the writer had seen at casual visits to clinics where the treatment was being used. But a sufficiently large number of them were by authorities who were entitled to speak on the subject to render an account of them all a hopeless task.

For several years past the medical world had been ready for something therapeutically new in the treatment of syphilis. Considering its remote and hereditary effects it is entirely comparable to tuberculosis as a scourge of humanity; and this latter disease had been so thoroughly studied experimentally and therapeutically that practical agreement had been reached on the various problems of therapeutics and prophylaxis. The results, though by no means ideal, had been a great improvement in methods, and a marked diminution in the mortality from the disease. It was to be expected that an improvement, at all events, in our treatment of the disease, would be the ultimate result of the renewed activity and reawakened interest in the luetic malady.

For many years the attention of syphilographers had been directed exclusively to mercury and iodine, the two drugs which abundant experience had demonstrated to be effective in the malady. Improvements in the method of their administration and refinements in technique resulted in the method of administration of mercurial salts, soluble and insoluble, by subcutaneous or intramuscular injection; so that finally we were in possession of therapeutic measures which were very potent, very rapid, and very effective in all but a very minute percentage of the cases. So marked was the improvement on the

older methods of administering the drug that the injection treatment has been adopted by practically every syphilographer the world over; though of course it takes time for a change of this kind to be generally accepted, and even today the great mass of our syphilitics are probably still treated by the ingestion or inunction of mercury; methods which, while by no means obsolete, are now to be regarded as subsidiary or auxiliary to the injection method. I have previously, on more than one occasion, called attention to and described these methods;¹ and I have also more recently detailed and criticised the attempts so frequently made in recent years to improve the iodine treatment by the preparation of a more assimilable and less toxic organic combination of the drug.²

Now it cannot be affirmed that the therapeutic results of the mercury-iodine treatment of syphilis have not proved satisfactory. Given in appropriate form and in proper dose, the medication has been universally accepted as efficient and prompt in all the disease manifestations directly due to the poison; and to such an extent has this been the universal experience that we have practically accepted the dictum that an affection which yields to mercury is syphilitic, and one which resists its action is non-luetic. This is the meaning of the so-called therapeutic test, so largely used as a help to diagnosis as well as treatment in doubtful cases. We expect and are accustomed to see lesions and conditions occasioned by the poison yield readily and promptly to the medication. We also are accustomed to see our cases of lues, when treated properly, systematically, and for a sufficient length of time, run a mild and almost benign course, with few severe symptoms, and with a final result which must be called a cure, if perfect freedom from all symptoms and a healthy progeny are any criteria to that effect. Of course, the results attained varied to a considerable extent in accordance with circumstances. The practitioner conversant with the disease and the modes of treating it, who is not wedded to a routine treatment and that usually the easiest and the least efficacious, who can control his patients, and who treats his sick patient rather than attacks the invading organism, finds syphilis extremely amenable to his efforts, sees very few so-called recalcitrant cases, and has every reason to be satisfied with the means at his command. It was very rare for him to encounter phenomena that he could not control; and it was equally unusual for him to meet the lamentable sequelæ of the disease upon which so much stress has latterly been laid.

This unanimity of opinion as to the means to be employed to combat the disease has, however, its drawbacks; not the least among which is the fact that it has led to a complete neglect and even forgetfulness of the knowledge that there are other means at our disposal in the

¹ *PROGRESSIVE MEDICINE*, September, 1906, p. 143.

² *Ibid.*, September, 1908, p. 140; *Modern Treatment*, Hare, vol. ii, pp. 124 et seq.

treatment of the disease which are not only sometimes more effective than the ordinary ones, but may, in isolated instances, accomplish the desired results when these latter are entirely ineffective. One of these only, as especially pertinent here, need be mentioned. Arsenic has long been known as an efficient antiluetic remedy, secondary only, if at all, to mercury in its power; it was known as the third antisypilitic remedy. Yet so completely have its powers in this direction been forgotten, that it is with astonishment that we read the following, which is taken from a paper "On the Effects of Arsenic," published by Hill in the *Edinburgh Medical Journal* of 1810, over a hundred years ago. The archaic flavor of its style does not render it less interesting:

"Syphilis. Few diseases of an equally terrible nature owe so much to medical skill as syphilis. The improved treatment now so universally established has greatly contributed to disarm this cruel Hydra of many of its horrid heads; still there are too many left, the obstinacy of which occasionally renders existence burdensome, or forms the first irrevocable step toward an untimely grave. I allude to those cases where the common remedy seems to have lost its power over the enemy, or some untoward symptom exists which is manifestly aggravated by continuance in the use of mercury. Precisely under these circumstances arsenic is found to confer great advantages, affording very commonly a resource, as much to be depended upon as its great precursor was in the more early and less obstinate stages of the complaint. Ancient syphilitic ulcers, whether of the skull, tibia, or sternum, in the throat, nose, etc., exulcerated, degenerated buboes, and cutaneous eruptions of long standing; the excruciating pains of the limbs, forcing the wretched sufferer from a wearisome bed at the midnight hour; exostosis and node; the anomalous syphilitic or mercurial fever; will all generally yield to arsenical remedies; with nitric acid in a decoction of the woods, cinchona, and occasionally opium; I add occasionally, because in a majority of cases the anodyne effects of arsenic render its constant use unnecessary."¹

It is not to be wondered at, therefore, that the attention of students in chemotherapy was powerfully attracted to arsenic in their attempts to find means to combat the various parasitic organisms, especially the trypanosomes and the treponemas. Serotherapy having been proved useless, and some of them, more especially the parasite of malaria, as regards quinine, having proved susceptible to the influence of certain chemical compounds, the problem seemed to be to start with a substance that had an indubitable effect on the organisms in question, and then to modify it through the almost endless series that organic chemistry places at our disposal.

To Paul Ehrlich, already world famous for his studies in the cellular morphology of the blood, belongs the high honors not only of having

¹ Therapeutic Gazette, May 15, 1910.

laid down the bases of what is practically a new science, but also of having achieved the first real results. This is not the place to attempt even a résumé of the interminable painstaking experimentation that led him finally to remarkable results. Suffice it to say that starting with proving the fact of the chemical affinity and selective action of many different substances on different body tissues, his endeavor has been to find the substance that would be most "parasitotropic" as he calls it, or most destructive to the parasitic organism in question, while being at the same time as little as possible "organotropic" or noxious to the body cells.

These remarkable investigations, prolonged over many years, have resulted in the elaboration of very many new compounds, especially of the arsenic group. *Atoxyl*, an empirical arsenical compound, had been found very useful in trypanosomiasis; and starting with this as a basis, an immense number of substitution products were made and tested on animals. In all of these the arsenic was the effective agent, the other molecules of the compound serving only to attach the drug to the parasite. In all the compounds examined, and there were more than 600 of them, only two or three approximately fulfilled the condition of being noxious to the parasite and harmless to its host. One of these was *arsenophenylglycin*, No. 418, and another was *arsenobenzol*, No. 606. This latter was finally the one that was given to the world as the long sought for remedy for syphilis. The fact that animals can now be inoculated with the disease permitted preliminary experimentation with the drug to be made; and this was so successful, both as regards the persistence of the spirochete and the appearance of further symptoms of infection and the effect on the organism in general, that the drug was soon employed in the treatment of cases in human beings. With praiseworthy caution every effort was made by Ehrlich to secure the very fullest amount of clinical evidence as to the effect of the remedy before placing it in the hands of the profession at large. It was sent all over the world, to individuals with clinical facilities, for its trial; and it was only placed on the market, in this country at all events, after many tens of thousands of cases treated had been reported on.

Several unfortunate circumstances, however, attended its introduction. In the first place, some of the drug fell into the hands of men who were not syphilologists, who were neither familiar with the phenomena of the disease or with the remarkable effects that attend the proper employment of mercury and iodine. Astounded at results that were new to them, but which were everyday occurrences to those habitually handling the affection, many of these observers filled the medical press and the medical world with their outcries; and on the strength of one or a few cases, proclaimed the conquest of syphilis, and incidentally their own merits in the battle. Nor were the non-syphilographers alone to blame in this matter; some whose experience

should have taught them better rushed into the fray holding aloft the banner of the new drug; as if syphilis in the past had been a malignant and unconquerable disease, against which medicine had been hitherto almost powerless, and which had now been finally overthrown. Nay more; men whose experience was gotten from the journals, and who had never treated a single case themselves, did not hesitate to inform even lay audiences that syphilis would be a memory only to our medical children, and their knowledge of it would be obtained only from the text-books. Undeterred by their experience with atoxyl in syphilis but recently¹ as well as by that with tuberculin some years ago, a remarkable wave of hysteria spread over the profession; and to such an extent did this go that I was actually taken to task in November of last year when I asserted on the basis of personal observations, that arsenobenzol did not do all that was claimed for it, and that it would be well to be slow in forming a judgment as to its merits.

In the second place, the drug as we now have it, is a plainly proprietary preparation; it has even been given the proprietary name of Salvarsan; it is made by a single manufacturing firm, and is sold at a high price; and it is said that attempts to manufacture it elsewhere have aroused the indignation of its originator.² It has certainly been advertised in the astutest manner. In Germany, it is reported that the daily papers last year published many columns concerning it; and we know that here the editorial columns of great newspapers and the pages of prominent magazines have teemed with accounts of it. Whoever is responsible for these things, the fact remains that these are the methods of the commercial exploiters of a new remedy.

Again, it cannot and ought not to be forgotten that "606" was placed upon the market for a definite purpose and with definite claims. It was to be a "*therapia sterilisans magna*," in rather pedantic phrase; and as a sterilizer of the syphilitic virus it has been received and acclaimed. As a mere improvement on the ordinary treatment, as a means by which larger amounts of the virus can be rendered innocuous than by a single mercurial administration, as an agent that would be effective where mercury was not, it would have attracted little attention save in medical and more markedly in specialist circles. To what extent the new remedy has fulfilled these expectations I shall endeavor to show in what follows.

Finally, and perhaps inevitably, good results and marvellous effects are recorded *ad libitum*; failures and untoward happenings are prone to remain unpublished and to be forgotten. This is the only way to account for the uniformly glowing and optimistic reports of last year which have already been modified and changed by the few that have the courage to acknowledge their mistakes. I shall say nothing here

¹ PROGRESSIVE MEDICINE, September, 1908, p. 134.

² Dr. A. Pulido Martin: *Siglo Medico*, September 10, 1910.

of the unmistakable bias shown by many reporters of results, especially in Germany; a bias so marked that even their own recorded cases will not stand the test of a critical examination.

Leaving now these general considerations, which have been warranted, I believe, by the importance of the subject, I turn to my own experiences and will detail my own conclusions as to the value and uses of the drug in the luetic infection. These are based not on the reports of others, not on cases seen incidentally at foreign clinics, but on some 40 carefully watched hospital cases of my own. The majority of these were injected in the Dermatological Wards of the City Hospital; and the results were minutely observed not only by myself, but also by the Assistant visiting on my service, Dr. Satenstein, by Dr. Noguchi, of the Rockefeller Institute, who did many of the earlier injections, by the House Staff, and by the experienced permanent nurses of the wards. The rest were cases treated in a private hospital. The cases themselves have been reported in the medical journals at various times, and the reader is referred to them for details.¹

The hospital patients were of the usual types, mostly rough and careless individuals, workingmen or women of the shiftless class, not sensitive to pain, attracted to the hospital by the newspaper publicity of the new remedy, and filled with the hope of getting rid of their infection at once and permanently. The private patients were all men. Their disease manifestations embraced most of the ordinary types, from the initial lesion to the late gumma, and a few of the unusual ones also. Many of them, of course, showed more than one lesion; so that there were 5 chancres, 18 general secondary eruptions, 9 cases of mucous patches, 2 cases of iritis, 4 cases of condylomata, 1 case of chronic meningitis, 6 cases of tertiary ulceration of the skin and mucosæ, 4 gummata, etc.

In the first sixteen injections the emulsion was employed, injected into the muscles of the subscapular region. These gave us in almost every case a large persistent induration. In many cases it was the size of an orange, and in five instances it gave the patients so much trouble, and was so persistent that interference became necessary. In about six weeks after the injection, incision and drainage had to be done; there was always a small amount of arsenic in the fluid centre of the tumor, but the most striking change was in their thick walls. The entire subcutis and all the muscle of the area involved was in a state of dry necrosis, deep black in color, and entirely insensitive. The process ended in each case with the slow extrusion of a large slough of the muscle and subcutis. Owing to the very large and persistent tumor formation, and the frequent occurrence of necrosis, this method was abandoned. The usual presence of some arsenic in the form of arsenite in the small amount of fluid in the centre of the slough led us to believe that ab-

¹ Medical Record, December 31, 1910; Albany Medical Annals, March, 1911.

sorption under this method of administration was slow, and might be imperfect; I therefore do not recommend the use of the suspension by this mode.

In all the other injections the clear solution was used, made as nearly neutral as possible. In regard to this latter point a good deal of misapprehension exists. An absolutely neutral clear solution cannot be obtained; as the point of neutralization is approached, precipitation occurs. We therefore neutralize just up to the point at which precipitation, as evidenced by the faintest cloudiness, is about to occur. The solution is necessarily slightly alkaline. The gluteal site was first tried, but was rejected after the third attempt. There was intense discomfort, occasioned by having both buttocks occupied by large, tender, and tense infiltrations; for we deemed the amount of the injection, some eighteen to twenty cubic centimeters, too large for injection at one site. The patients could not sit down, or lie on their backs in bed; they had to rest on their abdomens or stand. In none of these three cases, however, did the large permanent infiltrations or necrosis occur; thus clearly demonstrating the superiority of the solution over the suspension which we first employed.

We finally settled on the erector spinæ site as the most satisfactory, and that has been used in all the other injections. In some instances a large tense mass, extending well down to the front of the abdomen, was formed; in one or two of the cases the skin over the mass became dusky red, and it seemed as if something would have to be done; but all the phenomena retrogressed spontaneously in the course of about three weeks.

The amount of the drug employed has been almost uniformly 0.6 for men, and 0.5 for women, these being the average doses usually recommended. In three or four instances, we administered 0.4 or 0.6 without, however, being able to observe any differences in results from the variations. In all but the last case, the solution was diluted to about twenty cubic centimeters with the view of making it as nearly isotonic to the blood serum as possible. In the last case, a much more concentrated solution was used, making about eight grams in all; with the result of a very great diminution of the subsequent pain. It is too soon at the present writing to compare the relative efficiency of the dilutions; but I propose to employ the lesser amounts in the future, since there seems to be a prospect of minimizing a not inconsiderable objection to the treatment by this means, namely, the lasting pain that the larger injection occasions.

The technique which we employ is a simple one, but it must be carefully carried out, especially as regards the sterilization of all the materials employed and of the injection site. A covered glass vessel to hold the prepared solution, a stoppered graduated glass vial to make it in, some glass balls to help solution (I have not had any trouble from

minute spicules breaking off these), an appropriate all glass syringe, and a needle of fairly large caliber, and at least an inch and a half long, a 4 per cent. sodium hydroxide solution, and a little dilute acetic acid, are all that is required. The powder is dissolved in from five to fifteen cubic centimeters of warm, sterile, distilled water with the aid of the glass balls; when entirely dissolved, about two cubic centimeters of the sodium solution is slowly added. A gelatinous mass results, which dissolves entirely upon the addition of a few drops more of the sodium solution. Just enough of this latter is used to effect solution; if a little too much has been employed, a drop of the acetic acid must be added. The aim is to keep the drug just within the solution point, and as little alkaline as possible.

The following is the mode of selecting the injection site: Map out the posterior border of the crest of the ilium and the outer border of the erector spinæ muscle; one inch above the crest and one inch inside the erector border gives the location.

And now a few words as to the immediate effects of the injections. Pain, in our experience, is an invariable accompaniment of them, and is severe and lasting. Morphine was invariably administered hypodermically immediately after the medication; yet even our not very sensitive patients suffered greatly for the first few hours. By the next day the pain was much less; but local tenderness and sensitiveness often lasted for many days. Individual cases differed greatly, of course, in the severity of this symptom. In one or two cases, the pain was very slight, and the patient got up on the next day and went to work on the day following. In most instances, however, there was some pain for a week, and some disability upon motion for even longer. And this was the case no matter what form of injection or location was employed.

In a certain number of cases, there were distinct signs of renal irritation after the administration of the drug; it occurred in twelve out of the entire series. It was shown by the presence of red blood cells in the urine, usually appearing on the third day after the injection; but in four cases it was not seen until from the seventh to the fourteenth day. In four cases this was merely temporary, the abnormal find disappearing in from two to twelve days; and in another case, in which albumin was present, the same occurred. Three patients, who left the hospital shortly after their injection, still had red blood cells when last seen. In three other cases, hyaline and granular casts appeared later, and persisted up to the time of discharge, which, in one case, was two months afterward. Every one of these injected patients had a negative urine before the medication was administered, since it was not deemed proper to inject it where there were any renal changes, and the patients were kept under observation for a few days before it was given. That the use of the emulsion was not to be blamed for this by-effect was shown by the fact that four out of the ten renal cases

occurred after the injection of the clear solution. We have not met with them in the private cases injected later, nor have there been records of similar findings by others, at all events not to the extent that we met with them. I am unable to explain them, unless we assume that the earlier preparation sent out for the experimental use was less perfect than that now at our disposal. Possibly also very few of the multitude of recorded cases have been observed with the minuteness and for the length of time that ours were.

And now as to the therapeutic results obtained from the remedy, which, of course, is the essential point. In making up our minds on this matter several important considerations must be kept in mind. In the first place are two that have already been adverted to. Syphilis, as we meet with it today, and more especially in private practice, is a tractable and manageable disease. The syphilographer can only express his astonishment at the large number of so-called intractable cases, of cases which are called resistant to the ordinary medication, that are recorded today. I am perfectly sure that the great majority of them are mislabelled. They were rare before the advent of arsenobenzol; and probably more such have been recorded in a few large cities than their real total number the world over. Want of knowledge of the disease and of the real resources of our armamentarium to combat it is undoubtedly the reason of the phenomenon. Again, the *raison d'être* for the entire scheme of medication must not be lost sight of. It was introduced to destroy the specific virus, to sterilize the body, and to advise, as is largely done today, to supplement the treatment by an immediate recourse to the most approved and thorough mercurial treatment continued for at least the usual time, is really begging the question. No judgment can be formed of the efficacy of the treatment, which is the essential problem with which we are confronted.

It must not be forgotten, also, that there is a radical difference of attitude to the disease in many parts of the continent of Europe from that entertained here and in England and France. We look upon the malady as a long continued infection of gradually decreasing severity, to be treated with more or less persistence, symptoms or no symptoms, for the long periods that experience has demonstrated to be necessary. On the continent there is a marked tendency to look upon each outbreak of symptoms as a distinct disease entity, to regard each cessation of symptoms as a cure, at least temporarily, and to employ treatment only when the symptoms appear to warrant it. They therefore speak of cures and relapses in a different sense from our use of these terms; they discharge a case in which symptoms have ceased to appear for a certain time, perhaps with the proviso that they are unable to tell how permanent the cure may be, or how long it will last. Our custom is to go to the other extreme, and to doubt the cure of a case no matter how long the period of immunity from symptoms may last. Even the

Wassermann test is no certain index in this regard, since under the most varied circumstances of treatment, or even under no treatment at all, it may disappear for a time and then reappear as positive later. This difference of attitude must be taken into account in estimating the value of reported results emanating from these sources.

Before proceeding to analyze the results from the use of the remedy which I have observed, it is well to note in a general way that arsenobenzol undoubtedly exercised a markedly powerful and rapidly beneficial effect upon by far the most of them. Arsenic in this form, in which it could be given in doses that were entirely out of the question with the older preparations of the drug, was found to be a powerful antiluetic remedy, so far as immediate results were concerned. It failed, however, in some cases; in some others its action was slow, even halting and uncertain to the extent of unfavorable comparison with what we should have expected from a proper and vigorous mercurial medication in similar cases; and in others, again, it equalled what we are accustomed to see from the older methods. In no single case, however, was anything observed that was either unusual or marvellous; the results, as a whole, on the disease manifestations present were equal to those of successful mercurial medication. If the drug had been introduced as a rival to hydrargyrum, as a possible substitute for it, we should have been thoroughly satisfied with it; as a radical cure for syphilis it was entirely disappointing.

In 5 out of the 40 cases, the complete records of which are now at my disposal, there was no curative effect on the lesions present during an observation period of from six to eight weeks. One of these was a malignant general miliary and pustular syphiloderm which received two full injections with an interval of seven weeks between them. Cephalalgia persisted, new skin lesions continuously appeared, as did new mucous patches. Ten days after the first injection there set in a synovitis of the left knee joint. Red blood cells were still present in the urine when he was discharged. I have heard from this patient several times later; he was in the Jefferson Hospital, in Philadelphia, suffering from a mild grade of optic neuritis. Another case was one of ulcerated gummata of the legs; new gummata appeared one month after the injection, and after eight weeks the patient was put on mercury. The third was a case of gummatous ulceration of the dorsum and glans penis, in which the improvement in six weeks after the injection was so very slight that mercury had to be resorted to. In another case of late secondary syphilitic meningitis there was a slight improvement for two weeks, and then a relapse into his former condition. Finally, in a case of beginning tabes, the injection exercised no appreciable influence upon the patient's condition.

In 8 of the cases there was improvement after the injection; but the betterment stopped after a time, or new symptoms appeared; and they

were put on the ordinary treatment. These cases included general papular and rupial secondary eruptions, mucous patches, gummata, etc. The so-called relapses consisted of the appearance of new mucous patches, reappearance of the spirochete in various lesions, moist papules, periostitis, etc.

In some 15 cases, moderate success was noted; the symptoms improved slowly, but continuously. As instances of these, I may cite one of mucous patches of the mouth, which took six weeks to disappear and another of syphilitic periostitis which retrogressed in a month. It surely could not be claimed in any of these cases that the results could be accounted exceptional.

In the other cases, frank and gratifying success was achieved. Some macular eruptions disappeared in a week; moist papules and condylomata disappeared in from two to three weeks; iritis retrogressed in a month; ulcerated gummata improved quickly and healed in a short time. I am unable, however, to point to a single one of them which could be registered as an unusual or astonishingly brilliant result. The very best ones were perhaps quicker than might have been expected from mercury; but some of them were distinctly slower than we are in the habit of seeing. On the whole we concluded that, compared with what experience has taught us to expect from a similar series of cases treated by the older methods, the results, even in so far as immediate effects only were concerned, could only be regarded as fairly satisfactory.

GENERAL CONSIDERATIONS. Of course our experience with arsenobenzol is yet limited; it is still on trial, and it will be years before a definitive judgment can be pronounced. There are certain facts about it, however, which are already well established. These facts are in accord with those obtained from the unbiassed study of our first series of hospital cases; they are now acknowledged by practically all authorities; and it is a striking evidence of the influence exerted by expectancy and bias that they were not recognized earlier.

In the first place, arsenobenzol is an undoubtedly powerful agent in causing the retrocession of the active phenomena of constitutional syphilis. It is apparently possible, in many cases, to do as much or more with one or two of the injections as it is with a series of mercurial injections. This opens to it a field of usefulness in the early stages of the disease, when it is important, for family or social considerations, to destroy as much of the infective material as quickly as possible. In the later and deeper seated chronic manifestations of the disease, it sometimes succeeds in controlling the symptoms when mercury and iodine fail. In the remote and the parasymphilic affections, on the other hand, when organic changes in the tissues have occurred, it is just as ineffective as the older medication.

On the other hand, arsenobenzol does not cure syphilis any more than mercury and iodine do. Like these latter, it controls the mani-

festations of the disease, and may even cause the disappearance of the spirochete from the lesions and render the serum test negative. None of these things, however, are of themselves evidences of cure, unless they persist for long periods of time.

Arsenobenzol, therefore, does not displace mercury and iodine in syphilotherapy; it is rather to be regarded as a new and additional agent which is useful in many cases, and especially so in conjunction with the older medication. In fact, the advice from many quarters now is to administer arsenobenzol once or twice, and then to proceed with the regular and systematic mercurial treatment for the usual time.

It seems probable that with the new drug we have to reckon with the possibility of damage to the kidneys in a certain proportion of cases. How large that proportion is, or how permanent the damage, are some of the many questions that only the observations of private practice can determine. Similar occurrences from mercury are so extremely rare that we practically never take them into account.

Until quite recently I have regarded severe pain as an unavoidable feature of the arsenobenzol injection. So much was this the case that all of our City Hospital patients, by no means belonging to the delicate or sensitive classes, complained of it very greatly in most cases, and required large doses of morphine to bear it. The amount of injection fluid was always large, some 18 to 20 cubic centimeters; distilled water being added to that amount in the endeavor to make the solution isotonic with the blood serum. In our last few injections, however, we have varied this technique, and have dissolved the medicament in the smallest possible quantity of fluid, making 8 to 10 cubic centimeters in all. The pain has been distinctly less; though it is difficult to draw conclusions in a matter which rests so largely upon the personal factor.

A careful preliminary physical examination should be made in every case in which the drug is to be administered, to determine the presence of possible contraindications to the treatment. It is pretty generally conceded that it should not be used when there are definite organic lesions of the internal organs, more especially of the kidneys. The eyes should be examined by an ophthalmologist, for optic nerve lesions are a distinct contraindication. On the other hand, syphilitic eye processes, as iritis, are not necessarily such; I have myself used it with perfect safety and success in two cases of the kind.

Rest in bed for several days to a week under skilled observation I consider an absolute necessity. The treatment is not suited for ambulant administration, or in the office. There is sometimes a temperature reaction running fairly high, even up to 105° F.; there is the possibility of kidney complications; and the damage inevitably done to the injected tissues is sufficient to render this precaution unavoidable.

I consider the intramuscular injection the best method by all means to employ. The tendency at the present time is to recommend the

intravenous mode of administration; but there are several serious objections, both theoretical and practical, to its use. So long as the hope was entertained of destroying all the virus in the body at one blow, that method was the logical one; by the introduction of a large amount of the arsenical compound into the blood it was thought that all the microorganisms might be reached. Now that we know, however, that hope of such a "sterilizatio magna" must be abandoned, and that a partial sterilization, exactly like that effected by mercury is all that we can hope for, it does not seem proper to pour into the blood the large arsenical dose and have it all excreted, as it is, in a day or two. A slower and longer continued action is required, exactly as is the case with mercury. I do not think that there is much weight to the objection that the slower arsenical administration of the drug is liable to develop a strain of "arsenic-fast" treponemas, at all events in the comparatively short time during which absorption and elimination of the drug goes on. The practical objections to the method, however, are more obvious. It is a procedure which requires a fairly large amount of technical skill; certainly a larger amount than is at the disposal of the average practitioner. Serious accidents have occurred from its use, I am informed, though they have hardly found their way into the records. I have heard of several almost fatal, and at least one fatal case; and though these, like similar cases that have occurred in Germany, may be explained away by those interested, such explanations would hardly be of much value if similar occurrences happened to one of us. The intramuscular injection, on the other hand, has now been done all over the world in many tens of thousands of cases; and if they did not all turn out well (and that, as the novelists say, is another story), at all events they have been proved to be sufficiently safe to render their execution justifiable, in suitable cases, by anyone. The subcutaneous method of administration, at one time advocated by some, has been largely abandoned, and has not, to my knowledge, been used here.

Finally, a word as to the social aspects of the new remedy. It has unfortunately been so extensively and skilfully advertised to the laity that knowledge of its existence is very general, and infected persons ask for it. So also do many whose disease is running a perfectly satisfactory course under other medication, and not a few individuals whose syphilis has apparently run its course and who are in perfect health; and even some in whom there is no certainty that there has even been syphilis present at all. These people, of course, have the exaggerated ideas of the efficacy of the drug which were prevalent, even in medical circles, when it was first employed; and it is always a question in each individual case whether it is better to attempt the rather hopeless task of making the true status of the matter clear to them, or to give them the injection which they crave. To such patients the story of the conditions as they existed in the skin and syphilis

wards under my care at the City Hospital last fall may be of interest. We had a regular syphilis club there; patients were attracted in such numbers by the knowledge that the treatment was given there, that we had little else but lues either on the male or the female side of the service. These people came in for the purpose of being injected with arsenobenzol; they were greatly interested in the injections, and had nothing to do but to watch them, observe their results, and compare notes. Each administration of the drug was the occasion of great interest, so far as they could watch it, for the injections were done in the wards. It is a noteworthy fact that four patients, in whom the arsenobenzol results were not as brilliant as had been expected, refused reinjection absolutely; one said that "he would not take it if it were offered to him on a golden plate," and the others declared that they would leave the hospital unless they were given mercury.

It may seem premature to lay down rules for the employment of arsenobenzol at the present time; we have only used it for a few months; the technique of its employment is still unsettled; and even its possible dangers and disadvantages are still matters of investigation. But the widespread publicity which has been given to the medication has to a certain extent taken the option of its employment out of our hands. Acknowledging as we must its therapeutic efficiency as regards immediate results in a certain proportion of cases, and having satisfied ourselves in a general way as to the usual absence of danger from its employment, the practitioner is not in a position to refuse to employ it, even when he feels satisfied that as good results could be attained by older, better understood, and perfectly safe medication. It therefore becomes the duty to those who have had opportunities of using it on a larger scale to formulate, even if only in provisional form, the indications for its use. I believe these may be scheduled as follows:

1. Arsenobenzol does not cure syphilis; it is a symptomatic remedy of undoubted efficacy that may take its place with mercury and iodine in the treatment of the disease.

2. Its immediate effect may be better, in some cases, than that of mercury; in others, it is slower and less certain; in some cases, it fails entirely.

3. It cannot, therefore, replace the mercury-iodine treatment, but should be used in conjunction with it in suitable cases.

4. It must be used with care, since we are by no means fully informed as yet as to its action on the kidneys, optic nerves, and other internal organs.

5. It should never be given in ambulant or office practice; the patient should be carefully examined before it is administered, and should remain in bed under observation for several days after.

6. Its employment is indicated in the following cases: (a) Early cases, in which contagious manifestations are appearing in rapid

succession, in spite of efficient mercurial medication. (b) Cases in which, for family or social reasons, it is of special importance to limit the production of infective material or cause the disappearance of symptoms in the shortest possible time. (c) Cases in which the symptoms are recalcitrant to the action of mercury, or in which, from idiosyncrasy, that drug cannot be exhibited in sufficient dose. (d) Cases of syphilophobia and syphilomania, whether showing symptoms or not; its psychic action in these instances being of greater importance than its therapeutic effect. (e) Very early cases of the sequelæ of the luetic infection, before organic changes have occurred.

7. Its employment is contraindicated in the following cases: (a) Cases that are doing well, *i. e.*, in which the disease is pursuing its normal mild course under ordinary medication. (b) Cases with serious organic lesions of the eyes, kidneys, heart, or other internal organs. (c) Cases with postsyphilitic or parasyphilitic disease of the internal organs, more especially of the nervous system.

Sodium Cacodylate in Syphilis. Attention has already been called to the antiquity of the use of arsenic as an antiluetic drug. Atoxyl, and the various organic arsenical preparations proposed by Ehrlich, culminating in arsenobenzol (606), have caused renewed attention to be paid to the employment of other arsenical preparations in the treatment of syphilis. Cacodylic acid and its salts, and especially the cacodylate of sodium, have been before the profession for some time, but their use has never become general. As long ago as 1906, Bayeux¹ recommended their employment in syphilis, since they were less poisonous than the arsenites, and could be given in larger doses, even to children. Oppenheim² obtained good results from them, though he admitted that they were not specifics. He used a 25 per cent. solution of sodium cacodylate, injecting 1 c.c. daily subcutaneously. De Biehler,³ in addition to their effect on the disease, found that these arsenic salts caused increase in weight and improved the patients' condition. Roth⁴ and Gross⁵ both advocate the employment of mercury cacodylate in the disease.

Quite recently Caffrey⁶ has been using sodium cacodylate side by side with arsenobenzol, and claims to have obtained equally good results from both drugs. The patients tolerate the former drug very well indeed, and do not show any toxic effects until after very strenuous treatment. Crigler⁷ reports a malignant case of early rupial syphilis with gumma of the eyelid. Under daily three-quarter grain injections of

¹ *Revue internationale de médecine et de chirurgie*, 1906, p. 54.

² *Klinisch-therapeutische Wochenschrift*, 1907, No. 45, p. 1170.

³ *Archiv internationale de Pharmacodynamie et de Therapie*, 1907, p. 65.

⁴ *Prager medicinisch-chirurgische presse*, 1907, p. 211.

⁵ *American Journal of Urology*, June, 1910.

⁶ *Journal of the American Medical Association*, March 4, 1911.

⁷ *Ibid.*, March 25, 1911.

sodium cacodylate, within forty-eight hours the surface of the ulcer was smooth and healthy in appearance, the slough having disappeared. At the end of a week the ulcer had entirely healed, and with very little deformity. All the other ulcerations also cicatrized very rapidly.

From a number of other sources, and notable from Murphy, have come similar accounts. Personally, I have had practically no experience with the use of the organic arsenic preparations in syphilis, other than arsenobenzol. But I am convinced that they deserve a much more careful experimental investigation than they have as yet received. For no special reason that I know of, save perhaps the superior results so easily obtained from mercury and iodine, arsenic has gone so much out of fashion as an antiluetic remedy that it has practically been forgotten. Yet it was esteemed and employed many years ago; and it may again prove to be of value.

Syphilitic Optic Neuritis. This subject is of special importance at the present time, when the intensive arsenical treatment of the disease is so much in vogue. That the drug itself may occasion the affection is admitted; in fact, it was the frequency of the occurrence of this most unfortunate by-effect that led to the virtual abandonment of atoxyl in the treatment of the disease. Attention was called to this matter in these columns three years ago.¹ Cases of optic neuritis have occurred after arsenobenzol; I have had that experience myself once in the first series of 30 cases treated experimentally with the drug at the City Hospital. The rejoinder of overardent advocates of the new drug has been that affections of the optic nerve do occur in the disease, entirely apart from treatment; and that the affection is to be charged with it, and not the remedy.

As a matter of fact, however, while syphilitic affections of the optic nerve, both inflammatory and degenerative, are well known, they are seen more often by the ophthalmologist than by the syphilographer; as Taylor says, they are usually quite late manifestations of the disease.² I do not recollect having seen a case during the active period of the affection. Becker³ considers it such a rarity that he records an instance of a man, aged fifty years, who three months after his chancre had a unilateral optic neuritis followed by atrophy; eleven months later he had a slight neuritis of the other eye. This was published in a dermatological journal of repute; and Becker collects and recites the other cases that he has been able to find recorded, among others three which occurred six weeks after the chancre, and three after three and a half months. This he certainly would not have done if the affection had other than of very rare occurrence.

It is well, therefore, not to hastily ascribe a complication of so serious

¹ PROGRESSIVE MEDICINE, September, 1908, p. 134.

² Genito-urinary and Venereal Diseases, 1904, p. 592.

³ Dermatologische Zeitschrift, December, 1907, p. 744.

a nature occurring in the course of a syphilis that has been treated with arsenobenzol to the disease itself. Many thousands of atoxyl injections were given before the danger to the eye was recognized; and of course, in point of numbers, these latter were very few. I am not prepared to say at this moment that danger to the eye constitutes in any way a contraindication to the employment of arsenobenzol; the future only will show the true facts.

The Wassermann Reaction. Medical events move rapidly nowadays, and their knowledge is quickly disseminated. The serum test for the presence of syphilis devised by Wassermann has now been before the profession for a number of years, and we ought now to be able to form a definite idea both of its scope of usefulness and of its limitations. For it has very distinct and very decided limitations, valuable as it is, which have not been sufficiently emphasized. There is an unfortunate tendency now to rely entirely too much upon laboratory tests, especially in our larger cities where they are readily available; so that the mere fact of a certain test being positive is regarded as the sole diagnostic criterion, and settles the matter. As a matter of fact, a laboratory test, whether it be chemical, biological, or microscopic, is merely one element of the symptom-complex, and has only a relative value; it must be considered only in conjunction with all the other ascertainable signs. It may be very important if it is found; it is of very much less weight if it is absent. And the weight to be given to it depends, to a far greater degree than is the case with symptoms ascertainable in the ordinary ways, upon the skill and reliability of the examiner; the personal equation enters into it to a very great extent.

To none of the modern laboratory tests are the above remarks more thoroughly applicable than to the one whose name heads this article. As a general thing, the symptoms of luetic diseases are definite and easily recognizable. A syphilitic eruption, mucous patches, condylomata lata, the initial lesion, the iritis, the specific bone affections, etc., have characteristics which are perfectly distinctive; and in the presence of any one of them the serum test is of minor importance. It may be absent temporarily, and for various reasons; one of the commonest of which is treatment, either with mercury or arsenic; and there are probably other, as yet unknown factors which may interfere with its positive manifestations. It is a very delicate and complicated reaction, and its value depends largely upon the care and skill with which it is made. Its greatest value is of course when the other disease symptoms are doubtful, or when there are none. Even then, however, it should be well understood that it is a presumptive sign only. A patient may have a positive serum reaction, may have had syphilis, without his troubles necessarily being dependent on that infection. Certainly syphilitics are at least as liable as others to other infections and diseases. I am quite willing to put myself on record as affirming that in the pres-

ence of any indubitable symptom of the luetic disease, it does not matter what the Wassermann reaction is. I am glad to be able to state that the most prominent worker in the serum diagnosis field in this country, Noguchi, agrees with the diagnostic position I assign to this test, and deprecates the tendency to rely upon it to the exclusion of other signs. While experimenting with the new antisyphilitic remedy, arsenobenzol, in the City Hospital last fall, I had the pleasure and advantage of having Dr. Noguchi collaborate with me; and it was our custom to complete the examination of each new case by a serum test before administering the injection. In several instances of indubitable syphilis, the test was negative. One in particular, with a precocious general rupial eruption, gave a negative result. He was put on a placebo, and was given no antisyphilitic treatment at all for a month, his luetic symptoms meanwhile progressing regularly but slowly. During this month a large number of serum tests were made, I think over twenty in all, and all of them entirely negative. The only explanation possible was that the patient must have had mercurial treatment at some time previous to his entrance into the hospital, although he gave no history of it. A case such as this throws an instructive light both on the reaction and on the remedies in question. Both the mercurial and the arsenobenzol treatment may render the Wassermann reaction negative for an undecided period; my experience would tend to show that the former will do so for a longer period than will the latter.

It is of interest to note that this more conservative position as to the therapeutic and prognostic value of the serum reaction is now being taken by some of the most reliable workers in the field, among whom I may mention Drs. Howard Fox and Noguchi. The standpoint is practically the same in three valuable papers on the subject by Dexter and Clyde, Stoner, and Osborne, in a current medical journal.¹ I abstract from their conclusions the following:

1. The test should only be used in the light of the clinical findings.
2. Its real value depends upon its interpretation and a knowledge of its limitations.
3. The reaction is not specific in the ordinarily accepted sense of the term, but depends upon biochemical phenomena as yet not understood.
4. While a positive reaction means infection with syphilis in 99 per cent. of the cases, it cannot be regarded as conclusive without knowing the character of the work done by the serologist. The test is so delicate, and its technique must be so rigorously carried out that one examination should not be relied upon in doubtful cases.
5. A negative reaction has even less weight, and should be repeated and unimpeachable to be accepted.
6. Its chief diagnostic value is in obscure cases; as an indication as to therapy it is valuable, but less so than other symptoms.

¹ Cleveland Medical Journal, April, 1911.

7. The test can never supplant competent and exhaustive clinical observation, but can aid it greatly.

To these conclusions I would add:

8. In case of difference between definite clinical signs and the serum test, the former has the preponderating weight as evidence.

In justice to the writers of the article above quoted I will add that these conclusions represent my summary of their own, in addition to the lessons that experience has taught me personally.

Heredosyphilis and Idiocy. Arrested development is a prominent symptom of heredosyphilis, and it is not surprising that the nervous system should participate in the inhibitive process. Stertz¹ has shown the distinct connection between definite diseases of the nervous system and the inherited infection; positive serum reactions having been found in many cases of idiocy, imbecility, epilepsy, and dementia præcox. The older statistics, made before the development of the serum reaction test, are unreliable, since unmistakable evidences of hereditary lues is present in but few cases. The figures have ranged from a fraction of 1 to 23 per cent.; but they can now be rejected in favor of others based on the Wassermann reaction.

Lippmann² has made serum tests in 78 juvenile idiots, with a positive reaction in 7, being 9 per cent. of the cases; in another series he obtained a percentage of 13.2. The whole subject has been lately investigated again by Atwood, who has studied 204 cases with the serum test. A positive reaction was procured in 30, making 14.7 per cent. This is a sufficiently large percentage to warrant the suggestion that a serum test should be made in every case of idiocy to ascertain whether syphilis is a factor in its etiology. Lippmann suggests that the test might be applied to pregnant women in lying-in hospitals as a matter of routine, so that the mother could be put on treatment when indicated. Baisch's investigations in this field have shown that three-fourths of the women that showed a positive serum reaction had no clinical evidences whatever of syphilis. Treatment of defective infants after birth is often attended with striking success; many cases of marked improvement are on record in which the mercurial treatment of mental defectives was employed.

I am not in a position to venture an opinion on the psychiatric side of this question; but certainly many dangers to both mother and child where syphilis is present can be avoided by appropriate treatment during pregnancy and thereafter. I have long taught that systematic treatment should be instituted in any pregnant woman in whom there is any suspicion of syphilis, no matter how remote, in either progenitor. We may come finally to the point of having a serum test made during pregnancy, as a matter of precaution, even if we have no reason to suspect the presence of constitutional disease.

¹ Allgemeine Zeitschrift für Psychiatrie und Medicin, 1908, p. 565.

² Münchener medicinische Wochenschrift, November 23, 1909.

OBSTETRICS

By EDWARD P. DAVIS, M.D.

PREGNANCY

Changes in the Uterus Induced by Pregnancy. Bayer¹ calls attention to the fact that the lower uterine segment develops first in pregnancy from what he considers the upper portion of the cervix. The upper border is practically the internal os. The inferior portion has no sharply defined limit, but at times comprises the greater or lesser portion of the canal of the cervix. Cervical mucous membrane forming in this location is practically a genuine decidua. The formation of the upper portion of the cervix is made possible by an increase in the muscular tissue, which blends with that of the uterus. The inferior portion remains unchanged, and during pregnancy is closed. It is not in all cases observed that the ovum appropriates the upper portion of the cervix for its development. The internal os in some instances remains closed to the time of labor, and at the beginning of parturition constitutes a physiological stricture. In these cases, the lower portion of the envelope of the ovum is formed of tissue capable of contraction.

The tissue thus described, Bayer considers an isthmus between the lower uterine segment and the cervix.

The Increased Sensibility of the Uterus during Pregnancy. Schlesinger² believes that during pregnancy the uterus develops a specific sensibility to reflex excitement, such as fetal movements transmitted to the medulla through the sympathetic. In disease of the spinal cord this transmission may be prevented, and the uterus may remain an isolated organ. The sensibility of the uterus to movements of the child may be lost, although the abdominal wall may continue to be sensitive. The paths of this sensation in the spinal cord do not extend through the whole width of the cord, and are evidently in regions not common to the sensation of the abdominal wall. Uterine sensation is transmitted above the sacral cord, while the paths of transmission which excite labor pains pass through the sacral cord, and are near or identical with those conveying sensation from the skin of the abdomen. Lesions of the posterior cornua of the spinal cord, especially in the vicinity of the

¹ Beiträge für Geburtshülfe und Gynäkologie, 1909, Band xiv, Heft 3, and Band xv, Heft 2.

² Wiener klin. Wochenschrift, 1909, No. 5.

white substance, may destroy the sensibility of the uterus to fetal movements, and in these cases there is often an absence of great disturbance of the bladder and intestine. It is possible for the sensitiveness of the uterus to be lost without the destruction of the reflex, which may excite uterine contractions.

The Development of Decidua in the Vessels of the Uterus. Frankl and Stopler¹ found in the vessels of the pregnant uterus changes caused by the development of decidua. From the middle of pregnancy these cells penetrate the walls of the vessels and project into the lumen. At the end of pregnancy they form a considerable mass, usually covered by endothelium. As these masses extend not only in veins and arteries, but in the spaces between the muscle and deciduous membrane, their growth assists in the primary closure of the uterine vessels after the delivery of the child.

The Functions of the Ovary during Pregnancy. Fellner² has studied the changes in some of the glands of the pregnant patient, and especially in the ovary. He is convinced that during pregnancy the Graafian follicle ripens, but not to the same degree which occurs in the non-pregnant patient. The ova reach a certain period of development and then disappear; the epithelia of the follicles are absorbed, and the cavities of the follicles become cystic or disappear by absorption. The secretion product of these cells seems to be antagonistic to the secretion of the uterus.

The normal pregnancy, estimated at 271½ days, virtually consists of 13 pregnancy periods of twenty-one days each. If the ovarian period is as long as twenty-eight days, the pregnancy periods will be more than twenty-eight days, and the number of months occupied by the pregnancy will be reduced.

Fellner traces a relationship between the increased activity of the ovaries during pregnancy, and the enlargement and hyperemia of the liver observed during menstruation. As the same hepatic condition is present during pregnancy, Fellner believes that this depends upon ovarian secretion. The thrombotic phenomena observed in the liver during pregnancy arises from toxins produced in the metabolism of the fetus. As a definite secretion has not yet been isolated from the placenta, its influence in causing this phenomenon cannot be admitted.

The Glycogenic and Antitoxic Function of the Liver during Pregnancy. Delle Chiaie³ has compared the glycogenic function of the liver and muscles in pregnant and non-pregnant animals.

Pflüger's method was used in estimating the glycogen. He found that

¹ Monatsschrift für Geburtshülfe und Gynäkologie, 1909, Band xxx, Heft 4.

² Archiv für Mikroskopische Anatomie u. Entwicklungsgesch, 1909, Band lxxiii; and Archiv für Gynäkologie, 1909, Band lxxvii, Heft 2; and Zentralblatt für Gynäkologie, 1909, No. 45.

³ Archiv. Ital. di Gin. Napoli, 1909, No. 2 and No. 6.

toward the end of pregnancy the reserve glycogen of the liver decreased, and this was true of the glycogen ordinarily contained in muscle substance. This is owing not only to the diminished formation of glycogen in the liver, but to the greater consumption of carbohydrates. This is the result of fetal growth and of increased oxidation of glucose through the heightened oxygen contents of the blood.

In estimating the antitoxic function of the liver, no appreciable difference in the blood serum from the mesenteric veins of pregnant and non-pregnant animals, could be observed. When blood was taken from the suprahepatic veins, an increased amount of toxic material was observed in pregnant animals. This was the result of a lessened antitoxic function of the liver, with diminished destruction of toxic material absorbed from the intestine; and this diminution in function was greater as pregnancy drew toward its end. The organism during pregnancy is in a condition of latent toxemia, largely the result of diminished function in the intestinal tract, which shows itself in disorders of the liver and kidneys.

Respiratory Metabolism and Breathing during Pregnancy. Zuntz¹ has studied the respiratory metabolism and breathing of pregnant patients, and comes to the following conclusions:

He believes that from the middle to the end of pregnancy there is an increasing respiratory metabolism. In some patients, the respiratory rate is not greatly altered, but respiration is considerably more deep. This evidently is not the result of mechanical conditions, but is caused by a specific reaction of pregnancy, the respiratory metabolism at the end of pregnancy being very much greater than in the non-pregnant patient. Some of this is the result of increased respiratory effort, but after this is accounted for, the remainder is proportionate to the weight of the individual, and this must depend upon the metabolism of both mother and fetus. Variations in lesser degree in this phenomenon are seen with increase or decrease in the mother's weight.

A study of the respiratory phenomena of patients who are not pregnant, shows that, from the standpoint of respiratory metabolism, menstruation ensues in periods of thirty days. When this phenomenon is combined with observations upon the pulse, temperature, and blood tension, and Schatz's observations upon blood pressure during pregnancy are recalled, it is possible to foretell with considerable certainty the probable ending of pregnancy, and the beginning of labor.

The Nitrogenous Metabolism of Pregnancy. Landsberg² has studied the blood in pregnancy to determine the nitrogenous metabolism of the pregnant patient. He finds that in pregnant and parturient women the total amount of nitrogenous material is less than in those who are not

¹ Archiv für Gynäkologie, 1910, Band xc, Heft 3.

² Ibid., Band xcii, Heft 3.

pregnant; and in the newborn infant this is proportionately less than in the mother. The quantity of fibrin is greater in the pregnant woman than in the non-pregnant, and increases during parturition, but is less in the fetus than in the woman who is not pregnant.

He could not demonstrate the increase in fibrin in eclamptic patients over that commonly found in the normal parturient woman. In cases in which he examined the kidney of pregnancy, he did not find increased fibrinogen. The nitrogenous content of the kidney of pregnancy was very much greater than in the non-pregnant condition. No relation between the fibrinogen and leukocytes in the blood of the pregnant mother could be demonstrated. Fibrinogen seems to be formed in the liver, in the lymphoid organs, and especially in the bone marrow. It is doubtful whether leukocytes have much part in forming fibrinogen. Fibrin ferment in its formation draws heavily upon the quantity of leukocytes, especially the polynuclear. Fibrinogen depends largely for its formation upon the cells of the blood. In infectious diseases the polynuclear leukocytes seem much decreased, but there is a very great increase in the fibrin of the blood and in its other contents. It is not believed that the leukocytes are an essential factor in producing the kidney of pregnancy, or in bringing about eclampsia. It does not seem probable that fibrin ferment is the essential element in the production of eclampsia.

Hoffström¹ publishes a condensed account of his researches described in full in the Scandinavian *Archives of Physiology*, 1910, vol. xxiii. He finds that normal pregnancy in the healthy maternal organism, living in normal external conditions, produces a marked retention of nutritious material, which suffices for the development of the product of conception and its appendages, producing the necessary modifications in the generative organs of the mother, and causing an accumulation of reserved material, which is utilized during labor and the puerperal period. Normal pregnancy does not then constitute for the mother a period of loss and exhaustion, but is virtually the means of development and improvement in the general condition.

The Development of Antitrypsin in the Maternal Blood during Pregnancy. Grafenberg² finds that during pregnancy antitrypsin (the substance in normal blood serum which inhibits the action of trypsin on albuminized substances) is increased in the mother's blood. In the beginning of pregnancy antitrypsin is more than doubled, and remains in this increased quantity. This condition ceases to obtain from the eighth to the tenth week of the puerperal period. The increase in anti-

¹ L'Obstétrique, December, 1909.

² Münchener med. Wochenschrift, 1909, No. 14; Zeitschrift für Geburtshilfe und Gynäkologie, 1909, Band lxxv, Heft 1; Monatsschrift für Geburtshilfe und Gynäkologie, 1909, Band xxx, Heft 5.

trypsin is the reaction of the maternal blood against the growing villi of the chorion and the tryptic enzymes formed in the chorion.

As regards the diagnosis of pregnancy, the recognition of this body in the blood of the pregnant woman is difficult, because it is not a specific substance but resembles antiferments in the organism. The mother is protected from the tryptic enzymes of the chorion, not only by this substance, but by the decidua and the fibrin ferments described by Nitabuch. The mucous membrane of the uterus or substances formed in the decidua also have the same effect.

The Amino Acids during Pregnancy. Rebaudi¹ finds that in the urine in the greater number of normal pregnant women, the amino acids remain on the average within their physiological limits, although in individual cases great variations are observed. In patients who have autotoxic symptoms, such as headache, vomiting, and albuminuria, the quantity of amino acids is greatly increased. This result can only be produced by administering by the mouth to normal women in the latter months of pregnancy amino acids in considerable quantities.

The Bacteriology of the Genital Tract during Pregnancy. Observers differ widely regarding the significance of streptococci found in the vaginal secretion of pregnancy and their hemolytic activity.

Thus Konrad² and Kehred³ believe that streptococci are not abundant in the vaginal secretion of the healthy pregnant patient; that they have no hemolytic function; and hence that autoinfection must be of the rarest possible occurrence.

Sigwart,⁴ in examining 20 patients, found streptococci in the vaginal secretion of 9, and, among these, 3 showed typical hemolytic function, although the puerperal period of these patients was normal. He naturally concludes that one can gain no accurate idea regarding puerperal sepsis by the study of the streptococci found in the vaginal secretion.

Jung⁵ found staphylococci which could not be distinguished from virulent germs by their hemolytic function or by the test of agglutination.

The behavior of these germs is evidently greatly influenced by the immunizing substances in the mother's body.

The Diagnosis of Pregnancy. Grould⁶ drew attention to the sources of error in diagnosing pregnancy by abdominal palpation. Distention of the bladder and intestinal gas, ovarian cysts, fibromata, lateral flexion of the pregnant uterus, ectopic gestation, and vesicular moles, can all render diagnosis by palpation impossible.

¹ Atti. Soc. Ital. d'Ostetr. e Gin., October, 1909.

² Beiträge für Geburtshilfe und Gynäkologie, 1909, Band xiii, Heft 3.

³ Monatsschrift für Geburtshilfe und Gynäkologie, 1909, Band xxx, Heft 1.

⁴ Archiv für Gynäkologie, 1909, Band lxxxvii, Heft 2.

⁵ Zeitschrift für Geburtshilfe und Gynäkologie, 1910, Band lxiv, Heft 3.

⁶ Thèse de Paris, 1908.

To avoid such error Tuszkai¹ advises the palpation of the abdomen while the patient is in a bath, the water of which covers the abdomen completely. He finds that the fetal parts, and especially the head, can thus be isolated with great ease.

Studies in the Prolongation of Pregnancy. Ciulla² has studied 252 cases of prolonged pregnancy in Bossi's clinic at Genoa. He finds that 7.61 per cent. of all pregnancies vary from the normal, and that 10.83 per cent. are prolonged above the average. The age of the mother, her age when menstruation became established, the duration of menstruation, and the inter-menstrual period, occupation, rest, or the lack of rest during pregnancy, the stature, shape of the pelvis, and overdistention of the uterus, are all important factors in prolonging gestation. The most frequent and important cause is fatty change in the uterine muscle developing during pregnancy. This seems greatly influenced by the usual health of the mother, the number of pregnancies, her health during pregnancy, the presence or absence of hemorrhage, her physical stature, the number of times she has nursed a child, and the frequency and intervals at which pregnancies have been repeated.

Prolonged pregnancy is a complication, because labor, especially in the period of dilatation, is usually greatly prolonged; because the pains are essentially weak there is delay in the expulsion of the placenta and usually atonic bleeding. Such labor often requires operative interference, and injury to the mother may result.

Although, with good care, the prognosis for the mother is favorable, the mortality among the children reached 7.48 per cent. One does not find among these children excessive weight invariably, but more often unusual length. The bones seem precociously developed and the cranial bones are especially large and well ossified. The placenta is heavier than normal, especially in the case of male children. After birth, children born in prolonged pregnancy seem to do well. They grow rapidly, have good power of assimilation, and as the mother's milk is usually abundant and nourishing, they thrive. Their later development is not influenced by the prolonged gestation, but by their heredity.

So far as forensic questions involved in prolonged pregnancy are concerned, one must remember that 4.51 per cent. of pregnancies go over 300 days; 1.89 per cent. beyond 310 days; and 0.55 of one per cent. exceed 320 days.

The Pathology of Pregnancy. **PERNICIOUS NAUSEA.** A review of the recent literature shows an agreement in the majority of investigators concerning the essential nature of the pernicious nausea of pregnancy. It is regarded as a toxemia, the first manifestation of a process which in many cases goes on to eclampsia.

¹ Berliner klin. Wochenschrift, 1908, No. 25.

² Zeitschrift für Geburtshilfe und Gynäkologie, 1910, Band lxxvii, Heft 2.

As regards the *chemistry of the process*, Diesing¹ considers the essential element a disturbance of the sulphates set free in the process of digestion with a diminution in the quantity of iron held in combination in the organism.

Frigeysi,² from a study of cases, does not agree with Williams that an increase in the ammonia coefficient above 10 per cent. indicates toxemia and disturbance of the liver. He believes that this indicates only a process of starvation, as does the appearance of acetone and diazote; large quantities of leucin and tyrosin in the urine he thinks are of much greater importance.

Pinard³ reports a number of cases, and found that the most constant and important *symptom of pernicious nausea* is the rapidity of the pulse. The hepatic element he considers the most important. Among other symptoms he observed pyalism, the varying phenomena of nausea and vomiting, disturbances of the nervous system, and lesions in the skin from simple roseola to herpes.

He believes that the toxic agent is not the same throughout the entire period of pregnancy. In the earlier months it affects the vomiting centre, gradually producing increase in arterial tension, with very great rapidity of the heart's action; while in the latter portion of pregnancy the central nervous system becomes gradually involved, with excessive pulse tension, and eclamptic convulsions.

Pinard has come to no decision regarding the part played by the corpus luteum of pregnancy in this phenomenon.

Nolen⁴ reports an interesting case of pseudotumor of the brain which recurred in successive pregnancies, and was considered by him to be an hypertrophy of the hypophysis. He believes that the thyroid gland, the hypophysis, and other glands, have internal secretions which are altered in pregnancy, and that abnormal alterations in these bodies bring about toxemia. He refers to this cause, albuminuria, eclampsia, tetanus, diabetes, lesions of the skin, headache, and pernicious nausea.

As regards the *symptomatology*, Pinard recognizes three stages: (1) emaciation; (2) fever; (3) cerebral manifestations, followed by death. He believes that 58 per cent. of pregnant women vomit, and that with many this lasts through the entire pregnancy, with others, it ceases at the fourth month. Primiparæ and those with multiple pregnancies suffer most severely. He has twice observed pernicious nausea with ectopic gestation, and in 127 cases of molar pregnancy, pernicious nausea was present in 19. In some cases, when the patient became excessively emaciated the nausea ceased and the pregnancy went on to

¹ Monatsschrift für Geburtshilfe und Gynäkologie, 1909, Band xxix, Heft 5.

² Proceedings, Gynecological Section, Association of Physicians of Budapest, 1909, p. 143.

³ Ann. de Gyn. et Obstét., July and August, 1909.

⁴ Berliner klin. Wochenschrift, 1909, No. 49 and No. 50.

full term. Many patients suffer from peculiarly severe piercing and prolonged pain in the region of the diaphragm and ribs. Ptyalism and frequent swallowing were often observed.

Pinard never himself observed fever in these cases, but always great disturbance of the pulse. To better appreciate the progress of his cases, he has the pulse taken every four hours. When its frequency remained above 100 it was observed that the body was losing water rapidly; the skin became dry, jaundice developed, and the quantity of urine was diminished, often being mahogany or reddish-yellow in color; the respirations increased to 25 and 40 to the minute; there was usually constipation, but rarely diarrhea. Only in the moment of death did fever develop, and vomiting often ceased two days before death.

In these cases the uterus is smaller than normal, and, if the pregnancy is interrupted, the pulse remains rapid for several weeks.

As regards *treatment*, while Pinard recognizes the fact that in many cases suggestion may be useful, he believes that this is only true in those patients in whom the organism has already triumphed over the intoxication, and in whom vomiting continues because the habit has been formed. In his experience, suggestion is not valuable when marked changes in the pulse occur. It is useful only in treating symptoms. He begins first with a diet composed of milk and vegetables, and; if this is unsuccessful, he orders a strictly milk diet. If the pulse cannot be reduced below 100, he would interrupt pregnancy. The subcutaneous use of salt solution he believes of great value. After the pregnancy has been interrupted, he keeps the patient upon a diet of milk and water, if possible, until the pulse rate has become normal.

Wallich¹ orders a strictly milk diet given in small quantities. If this cannot be taken, he gives water only, with any harmless fruit flavor. If water can be retained, he then endeavors to give milk, at first diluted. If not even water is retained, he uses salt solution by the rectum or subcutaneously. In some instances, he has had good results from inhalation of carbonic acid gas and by giving chloral. If prompt improvement does not follow, he would interrupt pregnancy. He places more reliance upon the condition of the urine than upon the pulse.

Rebaudi² had good results from 10 drops of 1 per cent. adrenalin solution, given twice daily.

It is often difficult to decide, in these cases, when the pregnancy must be interrupted.

Devraigne³ believes that at the end of the second stage of pernicious nausea, before the case has become hopeless, that a polyglobular condition of the blood pertains. The blood becomes concentrated with an accompanying increase in the hemoglobin. In severe cases, before

¹ La Gyn., July, 1909.

² Proceedings, Academy of Medicine at Genoa, March 22, 1909.

³ L'Obstétrique, 1909, No. 5.

salt solution has been injected, if the number of red blood cells approaches 4,500,000 a good prognosis can be given. When, without special treatment, polyglobulin develops, the patient is highly cachectic and suffering from the deprivation of water and earthy salts. In these cases, the infusion of salt solution is most successful. If, in spite of this treatment, the number of blood cells remains greatly increased, the pregnancy should be interrupted. If the obstetrician waits until profound anemia develops, the interruption of pregnancy will be too late.

The reviewer's experience has taught him to consider the condition of the blood as the most valuable indication for the interruption of pregnancy. Not only the increase in blood cells but the dissolution of the hemoglobin in the blood cells is a most important symptom. Unless the blood be studied at frequent intervals during one of these cases, as Devraigne points out, the interruption of pregnancy will be done too late.

The Liver of Pregnancy. ATYPICAL ECLAMPSIA. Schickele¹ contributes an extensive paper upon this complex and difficult subject. He reports a number of illustrative cases, and discusses the belief prevalent at the present time. He made experiments upon pregnant mice to determine the presence of fat in the liver, and also the glycogenic function during pregnancy, and comes to the conclusion that, with very few exceptions, pregnancy greatly disturbs the functions of the liver.

He finds essentially two processes present in the liver of the pregnant patient: In the first group are those described by Pilliet, Schmorl and others, consisting of miliary, confluent, anemic, and hemorrhagic necrosis. The liver cells which remain essentially unaltered are laden with fat, such as the liver typical of eclampsia with or without convulsions.

In Hofbauer's cases of pernicious nausea, the deposit of fat occurred in the central cells of the acini but without degeneration; while the cells of the periphery showed beginning changes.

The second group of changes found in the liver are those of a widely disseminated degeneration of the parenchyma, the healthy tissue remaining in islands, the degenerated portion being markedly infiltrated with fat. Hemorrhage occurs without especial localization. These changes are observed in severe toxemia, often after atypical eclampsia.

He appends the report of 4 cases in which eclampsia was not accompanied with the usual manifestations.

He describes an especially interesting case where a woman was admitted to the clinic for treatment for an ovarian tumor. It was thought that the tumor had undergone suppuration, or that possibly it was a suppurating dermoid. At operation, the tumor was found to contain a chocolate-colored and odorless fluid. There was no torsion

¹ Archiv für Gynäkologie, 1910, Band xcii, Heft 2.

of the pedicle; the intestine seemed normal; the uterus was enlarged. The tumor was a dermoid, containing hair, fat, and other materials, but there was no sign of suppuration or infection.

The patient died on the fourth day in delirium, with jaundice, coma, frequent vomiting of coffee ground material which was not feculent. There were clonic convulsions in the extremities. The pupils remained greatly contracted, but were dilated by atropine; the urine contained no albumin, but bile pigments. The coma and vomiting persisted until death.

At autopsy, the liver was much enlarged, with pronounced parenchymatous degeneration. The patient had been pregnant, and the case was one of the toxemia of pregnancy. An abortion had evidently occurred just before the patient entered the hospital for operation. Toxemic lesions of a pronounced character were found not only in the liver, but in the kidneys, heart and spleen, in the skin, the mediastinum, pleura, esophagus, and the stomach.

He also draws attention to a case, possibly ten weeks pregnant, in which the patient's symptoms were those of pallor, cyanosis, bloody urine, a bloody discharge from the vagina, and extravasation of blood into the stomach. There was also leakage of blood beneath the skin.

The patient died soon after admission, and upon autopsy an extensively toxemic blood and the consequent lesions were found.

This calls to mind a case recently seen in consultation by the reviewer, in which a pregnant patient who had in former pregnancies been toxemic, was suddenly taken at night with excruciating pain in the epigastrium, and shock. She was at once brought to the hospital, where she vomited a large quantity of bright blood. There was also tarry fluid in the discharges from the bowels. The pulse tension and temperature were low, and had not the pregnancy been advanced sufficiently far to make the diagnosis certain, the symptoms would have been those essentially of gastric or duodenal ulcer.

Lavage of the stomach with calcium chloride solution seemed to check the oozing of blood into the stomach. The patient was shortly after delivered of a macerated fetus, and within the succeeding twenty-four hours died suddenly. An autopsy could not be obtained.

Schickele believes that eclampsia may develop in typical fashion with convulsions; in an atypical fashion without convulsions, as severe, deadly, pernicious nausea and as fulminant toxemia with ptyalism, lesions in the skin, neuritis, vomiting, disturbance in the special senses, and other symptoms.

In the first three forms, jaundice is often observed. The lesions in the liver characteristic of eclampsia may be found in any of these cases.

He found, in all cases of typical eclampsia, a great increase in the aminol acids. These varied considerably in different cases, and were not always proportionate to the extent and severity of visceral lesions

observed. This undoubtedly results from a rapid and extensive decomposition of albuminoid material. Under the influence of the various toxins in the body of the pregnant patient, the liver becomes insufficient to perform its immunizing functions, and a rapidly progressing intravital autolysis results.

There is some analogy between this process and acute phosphorous poisoning, in which the ammonia products increase very considerably.

Pregnancy Complicated by Infectious Disease. At present, two of the important infections are the subject of especial interest to obstetricians. We refer to *tuberculosis* and *syphilis*.

Regarding the former, there is still considerable difference in opinion as to the advisability of interrupting pregnancy.

In 170 cases, Monier¹ found evidence that there are many women who in girlhood have been tuberculous with bone or joint lesions, who have recovered and married in adult life, and have had repeated pregnancies without acquiring pulmonary tuberculosis. The larger percentage of deaths from tuberculosis among women, is in young women and married women without children, from which Monier concludes, that pregnancy not necessarily protects women against tubercular infection, but that pregnancy does not rekindle and increase the severity of tuberculous infection.

Rieler and Mayer² removed the uterus at three months' pregnancy in a case of acute tubercular infection. The pulmonary symptoms diminished greatly and the patient gained in weight. Lesions indicating tubercular infection were found in the decidua. These must have gained access through the blood current.

Kammer³ has studied the question as to whether the ophthalmic reaction against tubercular infection is of value in pregnant patients. He does not find it is sufficiently reliable to base a decision to interrupt the pregnancy by this method. It does not seem to him reasonable to adopt Martin's suggestion and remove the uterus and ovaries in pregnant patients who are tuberculous. He believes that tuberculous patients grow fat because they grow better; but do not necessarily grow better because they grow fat. He would suggest therapeutic abortion, which is a comparatively slight interference, for the radical operation of extirpation.

Martin⁴ reports some very interesting cases of tuberculosis complicating pregnancy in which the conjunctival reaction was of value in making a positive diagnosis. Martin treated 60 of these cases by the removal of the uterus and ovaries under lumbar anesthesia. The results were exceedingly good; the tuberculous process was stayed; the patients

¹ Zentralblatt für Gynäkologie, 1909, No. 44.

² Archiv für Gynäkologie, 1909, Band lxxvii, Heft 1.

³ Berliner klin. Wochenschrift, 1909, No. 9.

⁴ Münchener med. Wochenschrift, 1909, No. 24.

gained markedly in weight and in strength; in 7 patients in whom pregnancy was interrupted without removal of the uterus and ovaries, 3 died six weeks after, and 4 twelve months after.

Syphilis during Pregnancy. Pinard and Girauld¹ have studied the influence of syphilis upon pregnancy. They quote Fournier's investigations, who found among 239 syphilitic pregnant patients 176 fatalities, about 73 per cent.

For the fetus, it is of practical import whether the syphilis is conveyed from the father or from the mother, as, in the latter instance, the prognosis for the fetus is worse than in the former. The most dangerous time for the syphilitic fetus is in the first three years after birth, and after this period the secondary phenomena appear. In the second generation, the fatal influence of syphilis upon the offspring is not less than in the first. The syphilitic virus shows its effect upon the fetus in different ways. If the fetus does not perish in the uterus, the living child shows many symptoms of a serious disease.

In making the diagnosis, a Wassermann reaction is important as a serum test, and the bacteriological examination for *Spirochæte pallida*. In *treatment*, the use of mercury by inunction is considered the most reliable, and each syphilitic woman during pregnancy should receive such treatment.

Baisch² has frequently found the *Spirochæte pallida* in macerated fetuses. All mothers of syphilitic children give a positive reaction to the Wassermann test. The detection of *Spirochæte pallida* in the maternal portions of the placenta is not negative evidence of the possession of syphilis by the mother. Many children of syphilitic mothers remain healthy and give a negative test to the Wassermann reaction. A positive reaction and the detection of *Spirochæte pallida* in the maternal portions of the placenta show that syphilis in the child without syphilis in the mother, but with an entirely paternal infection, is present. In such cases, a vigorous antisymphilitic treatment of the mother during pregnancy will be effective.

In the study of 100 cases, Baisch found evidence that Colles' law does not always obtain. He found that in about 8 per cent. of primiparous patients giving birth to syphilitic children, the infection seems to run a mild course in the mother, but that in subsequent pregnancies it becomes very much more virulent; 90 per cent. of all mothers having syphilitic children are positively syphilitic, although a large number of these patients may show no symptoms at the time.

Grafenberg,³ in 50 cases of fetal syphilis, could demonstrate *spirochæte pallida* in 3 by using the usual method of inoculation. He found that *spirochæte pallida* were rarely present in the placenta. When chil-

¹ Gazette des Hôpitaux, 1909, No. 115.

² Zentralblatt für Gynäkologie, 1909, No. 42, and 1909, No. 28.

³ Archiv für Gynäkologie, 1909, Band lxxxiii, Heft 1.

dren are born living from syphilitic mothers, the diagnosis could best be made by examining the umbilical cord close to the umbilicus. In 39 syphilitic fetuses, the *Spirochaete pallida* were found in the connective tissue of the abdomen and in the umbilical cord in the walls of the umbilical veins.

Bar and Daunay¹ in studying the serum diagnosis of syphilis in pregnancy came to the conclusion that a positive reaction is proof of syphilitic infection, while a negative reaction is not always conclusive. Even a positive result may not be obtained in pregnant patients with florid syphilis who are under vigorous treatment. These cases are probably those of infection through the placenta. In cases in which the pregnant woman, though syphilitic, shows no actual symptoms, the serum reaction is often negative. A positive result may indicate a purely active syphilitic infection which has not yet given visible signs of an active or virulent fetal infection, in both instances calling for active treatment.

We do not as yet know whether the blood serum of the child or the mother gives the better reaction in such cases. When the mother's syphilis is pronounced, the reaction from the child's serum is less than that of the mother; and when the mother's symptoms are not well established, the serum of the child often gives the more positive reaction. When the mother has recently become syphilitic, after conception, the serum reaction is much stronger with her than with the child. Mercurial treatment of the mother often produces a negative result in the serum test, when the child's serum gives a positive result.

Goudy² finds that syphilis acquired by the mother after conception may be conveyed to the fetus at all periods of pregnancy. In the first six months infection is the rule, and in more than one-third of the cases pregnancy is interrupted. In the last three months the child is often infected, but syphilis may appear days or even months after the birth of the child. Pregnancy usually goes on to the end in these cases, the child surviving. The infection travels undoubtedly through the blood current, and the *Spirochaete pallida* pass through the placenta.

Pregnancy Complicated by Nervous Over-development. Newell³ draws attention to the difficulty of dealing with patients in whom pregnancy is complicated by nervous overdevelopment. In trying to forecast the probable outcome of labor, the pelvis must be accurately studied in these cases, and an estimate of the muscular power of the individual patient is important. An important factor to be considered is the probable nervous resistance of the patient—whether she is liable to have a nervous explosion at or shortly after labor, or whether the after-affect of pain and exhaustion may not have a serious and permanent influence in her after-life.

¹ L'Obstétrique, 1909, Nos. 1, 3, and 4.

² Thèse de Bordeaux, 1909.

³ Surgery, Gynecology, and Obstetrics, March, 1910.

It is necessary in these cases to learn what the patient's early life has been as regards education, society, and all forms of nervous strain. Newell states that it is estimated in Boston that the majority of the girls who enter society have at least one or more nervous breakdowns demanding a modified rest cure, before reaching the age of twenty-five years. This condition naturally leads to the conclusion that at least one-half of society women are nervously unfit to undergo unnecessary burdens in their after-life, and that with them every safeguard must be employed to prevent the strain of pregnancy and labor from producing a serious and lasting effect. The same is true of a large proportion of college women who have overtaxed themselves in other ways, producing a similar result.

Another group of cases are those women who have always been sickly and delicate, but who have been brought to adult life by unusual care. Such are obviously both physically and nervously unfit for the strain of maternity. In others, when pregnancy supervenes, the patient does not accommodate herself physiologically to the changes which naturally go on during pregnancy. Such develop toxemia, with impairment of the muscles of the body, including the cardiac muscle, threatening dilatation when parturition occurs. It is always difficult, in dealing with such patients, to estimate the probable result of the strain of labor.

In prophylaxis, the pernicious influence of early education must be recognized. The crowding of modern education into a few years, at a time when a girl is undergoing the greatest physical development, cannot fail to lessen her physical power.

Under these conditions, it is evident that such patients must receive careful attention during pregnancy. In whatever direction they are manifestly weak, an effort must be made to supplement their deficiency. As the time for delivery approaches in many of these patients, it can be seen that they are ill-fitted to stand a long and severe strain, although many of them will endure a brief ordeal successfully.

Labor in these cases must be so conducted as to avoid shock and exhaustion. When vaginal delivery is possible the early use of anesthetics and prompt delivery by instrumental means are indicated. A complete repair of lacerations and prolonged rest after labor are needed. In some cases, delivery by section should be selected before labor, thus avoiding the strain of parturition.

The Treatment of the Albuminuria of Pregnancy by Blood Serum from the Renal Vein of the Goat. Daunay and Lequex¹ report the results of their experiments in the treatment of the albuminuria of pregnancy by injections of blood serum from the renal vein of the goat. They found that such injections produced increased diuresis. In patients upon a milk diet, when albuminuria had been but little influenced by the milk

¹ L'Obstétrique, March, 1910.

diet, an injection of this serum lessened the albumin. When a temporary increase in albuminuria followed the injection, it rapidly gave place to a marked diminution. Each injection was followed by a very decided increase in the granular elements in the blood of the patient. Three cases are reported in detail.

The Estimation of the Glycolytic Function in the Prognosis of the Toxemia of Pregnancy. Lequex¹ has made observations upon patients suffering from the toxemia of pregnancy by giving a certain amount of carbohydrate in the form of cane sugar, and then examining the urine to determine the glycolytic function.

He finds a marked diminution of this function, a valuable sign of the degree of toxemia, and makes the general observation that when the glycolytic function is less than one gram to the kilogram of the body weight, that the prognosis becomes so grave that pregnancy should be interrupted.

Transfusion of Blood during Pregnancy. Delmas² has experimented upon pregnant animals to determine the results of the direct transfusion of blood. He finds that by this means blood loss can be rapidly restored. This may be done by direct anastomosis from the artery of the blood giver to the vein of the recipient, with the aid of a segment of vessel, or by intravenous injection of blood globules. The coagulability of the blood is increased by this procedure, and in this regard the injection of blood globules has a lesser influence than direct transfusion. The destruction of globules does not follow transfusion, but the sum total remains fully as great as that before transfusion. This procedure has no influence upon the course or duration of pregnancy. The influence upon the development of the fetus seems favorable.

The examination of the blood of the mother and of the infant after transfusion shows no harmful result. The hemolysis, agglutinative power, and the precipitated material of the blood, shows no change. There is no reason, clinically speaking, why transfusion of blood should not be practised repeatedly during pregnancy for severe blood loss in the mother, or disease attended by rapid anemia. Injections of washed corpuscles may be utilized to combat the dangerous anemias of pregnancy.

Fatty Changes in the Kidney of Pregnancy. Chirié³ studied the fatty changes which occur in the kidneys of pregnant patients. He finds that fat can be distinguished abundantly through various portions of the kidney, especially in cross-sections of the tubules, while the glomeruli do not participate in the phenomena. He believes that this change takes place in pregnancy and lactation, and that it seems to be associated with the excretion of fatty materials.

Its precise nature can only be determined by a more complete study of the urine.

¹ L'Obstétrique, May, 1910.

² Ibid.

³ Ibid.

Infection of the Urinary Tract with the *Bacillus Coli Communis* Complicating Pregnancy. Burnett¹ reviews the literature of the subject, adding histories of 4 cases which recently came under his observation.

In one, the patient was delivered at labor by forceps, and on the tenth day of the puerperal period developed thrombosis in the leg, and, upon examination, the colon bacillus was obtained from the lochial discharge. In the third case, pregnant at four months, all treatment, including autogenous vaccines, was unavailing. The patient's condition became so serious that on the twelfth day nephrotomy was decided upon, but when the patient was being prepared for the operation she aborted with twins, and made a gradual recovery.

The other two cases recovered with medicinal treatment. Burnett considers the acute cases as occurring most frequently at the fifth and sixth months, and sometimes as early as the fourth month. Some of these have bladder symptoms and others renal disturbances.

The latter group is more numerous. The patient is suddenly seized with rigor and high temperature, with diffuse abdominal pains, soon restricted to the right renal region. Nausea and vomiting are often present. There is also furred tongue, and in many cases constipation. The urine is scanty and highly colored, but in some cases there is disturbance in the functions of the bladder.

Upon physical examination, there was rigidity of the abdominal muscles on the right side, the patient often pointing to the appendix area as the site of the greatest suffering. The intestine is often somewhat distended. Upon palpation, there is most often tenderness over McBurney's point and extreme hyperesthesia over a wide area in the right kidney region. When this is present, the case is usually not appendicitis, but kidney infection. When the bladder is affected, vaginal examination will show tenderness over the whole posterior bladder wall. There is often a very tender spot where the right ureter enters the bladder, and sometimes the ureter may be so thickened or dilated that it can be palpated through the vagina. The temperature varies from 99° to 104° F., in severe cases remaining high. Persistent high temperature usually indicates the involvement of both kidneys. Without other complications, the pulse is proportionately low, from 100 to 110. The pain is usually renal colic pain with a wide area of hyperesthesia over the hypogastric region.

Attention is called to McKenzie's statement that renal colic is not sensitiveness of the kidney, as that organ, like other viscera, is insensitive; but that renal pain is a referred pain of the overlying structures, especially of the muscles.

The urine is remarkable for the fact that there is no ammoniacal odor, for the *Bacillus coli communis* does not split up urea into ammonia.

¹ Journal of Obstetrics and Gynecology of the British Empire, July and August, 1910.

If pyelitis and cystitis be present, there may be mucus, lymph, and pus cells. With no inflammatory lesion, the urine may be perfectly clear, if the organisms are not very abundant. If they are in great quantities, the urine will be turbid, resembling that of pyuria. When the bacillus is present in pure culture, the urine is acid, but if the infection be mixed with staphylococci or streptococci, it may be neutral or even alkaline. If the specific gravity remains unchanged, sugar is rarely present, but albumin in small quantities is seldom absent. Hematuria is comparatively rare.

Upon microscopic examination, pus cells and active leukocytes are present, and the *Bacillus coli communis* is recognized in culture. There may be some red cells and epithelial débris.

Upon examining the blood, there is a secondary anemia, and the polynuclear leukocytes are markedly increased. The *Bacillus coli communis* is rarely found in the blood.

Acute cases, untreated, persist through several weeks with increasing toxemia and repeated chills. If the patient does not abort, the parenchyma of the kidney is involved and the case becomes one of septicemia. In chronic cases, the onset is more insidious, the symptoms are not so pronounced; the pain and tenderness in the structures overlying the kidney and ureter are always present. A careful urinary examination will establish the diagnosis.

Mild cases are often overlooked, and as patients complain of intermittent attacks of pain, they are thought to be lumbago. A careful examination of the urine will establish the diagnosis.

Attention is called to the common error of mistaking the *Bacillus coli communis* infection of the right kidney for appendicitis. The second error is that of confusing this condition with malaria from a similar temperature record. Another source of confusion lies in mistaking this condition for pleurisy, and in some cases the passage of renal calculus is thought to be a bacillus colon infection.

It is probable that the infection may be hematogenous, the bacilli descending from the kidney to the ureter and bladder. It is also undoubtedly ascending in many cases. There is no evidence that the pressure of the uterus upon the ureter causes retention of urine and produces this condition. It is probable that the proximity of the ascending colon to the right kidney, as pointed out by Mirabeau, permits the direct transmission of bacteria from the colon to the kidney.

As regards *treatment*, rest in bed, purgation, bland diet, and abundant food will usually relieve the mildest cases. Citrates and acetates of potassium and sodium are often useful.

Burnett has not seen good results from *urotropin* when the infection is due to pure culture of the *Bacillus coli communis*. *Helmitol*, which liberates more formaldehyde than urotropin, is also, in his experience, disappointing. When the infection is a mixed one, these drugs are useful.

Serum treatment has not been satisfactory because the *Bacillus coli communis* does not develop an antitoxin.

Theoretically, *vaccines*, when autogenous, should be beneficial, although in Burnett's experience the result was disappointing.

Rovsing, in 12 cases, obtained good results, and the vaccine may ameliorate the symptoms, although it does not cure.

Douching the pelvis of the kidney with antiseptic substances through a ureteral catheter may be a valuable method of treatment.

In operative treatment, *nephrotomy* may be performed, or the pregnancy may be interrupted. Burnett believes the latter usually the better operation.

The reviewer has recently had an interesting experience which illustrates some of the points in Burnett's paper. A primipara, eight months pregnant, was admitted to the Jefferson Maternity complaining of pain in the right abdomen. This could not be definitely localized. The urine was acid, clear, containing leukocytes, and abundant *Bacillus coli communis*. As the patient was thin, the enlarged right kidney could be plainly felt and it seemed to increase in size. The patient had a leukocytosis of 29,000. As no improvement followed rest in bed, milk diet, purgation, and urotropin, the right kidney was exposed by incision and found to be dark bluish in color, and much enlarged. Two iodized catgut stitches were passed through the capsule, bringing it to the edges of the wound, and the convex surface of the kidney was incised and a finger passed into the pelvis. No pus escaped, but abundant blood. The pelvis was then packed with a strip of 10 per cent. iodoform gauze, oozing in the kidney controlled by this gauze packing, and the greater portion of the wound closed. As pus had not been found, and the leukocytosis was so high, the appendix was then removed. This was found postcecal at the pelvic brim, and showed no lesions except a mild catarrhal condition.

The patient improved steadily, the kidney draining freely, and the leukocytosis 10,000. The wounds have healed by first intention, except the fistula, which was kept open by gauze packing. No signs of labor followed the operation.

Between two and three weeks after the operation, while the kidney fistula was still draining, the patient had a short, spontaneous labor, giving birth to a small but well-developed child. She nursed the child successfully, the kidney fistula closed, and she and her child left the hospital in good condition.

A second illustrative case was that of a young primipara, between six and seven months pregnant, who was sent to the Jefferson Hospital, with a diagnosis made by her attending physician of disease of the pelvic organs following typhoid fever. She was transferred to the maternity department, when examination showed indefinite pain in the right lumbar and abdominal region, considerable elevation of tem-

perature, with depression and general malaise. The urine did not contain the *Bacillus coli communis*. The patient's leukocytes were considerably increased, and her general appearance was that of sepsis.

Upon cutting down the right kidney, it was found very high, and was brought into the wound with difficulty. It was enlarged, congested, and anchored in the wound, and drained in the manner described. The appendix was enlarged, adherent, and there were evidences of former peritonitis in the right, lower abdomen. The patient made a good recovery without the interruption of pregnancy, and went to her home for her confinement.

Renal Surgery in Pregnancy. At a recent meeting of the French National Congress of Gynecologists, Toulouse, 1910, Pousson,¹ of Bordeaux, contributed an interesting paper upon this subject, and Pinard, Hartman, and others supplied an interesting discussion.

Pousson found that patients subjected to nephrectomy did well in subsequent pregnancies. In 66 such cases, 59 were delivered at term, most of whom nursed their children, one becoming a wet-nurse.

Pinard had observed that a woman with a tuberculous kidney may be cured by nephrectomy, and afterward pass through a normal pregnancy.

Israel had reported 15 pregnancies in 8 of his patients from whom he had removed a tuberculous kidney. These pregnancies were uncomplicated and labor was normal.

Hartmann reported 113 cases of renal operations, 35 during pregnancy, and 78 followed sooner or later by pregnancy. Among 35 he included Cragin's vaginal nephrectomy for the removal of a displaced cystic kidney in the pelvis obstructing labor. Normal delivery occurred on the next day.

In Twynam's case, complications arose which made the induction of labor necessary three weeks after nephrectomy; 26 more nephrectomies during pregnancy were included, one dying of eclampsia on the second day; the other had phlebitis before the nephrectomy. In the remaining 24, pregnancy went to term in 22. In 4 out of 5 nephrotomies in pregnancy, gestation went to term. The fifth case died on the second day after premature labor. In one nephropexy, and one incision into a perinephritic abscess during pregnancy, there was no premature delivery nor other complications.

In 78 cases in which pregnancy followed renal operations, in 74 nephrectomies 72 became pregnant and went to term from one to four times, and two aborted. There were only two deaths in the puerperal period, one with eclampsia, the other with anuria without convulsions. Thus in 70 cases a single kidney carried the patient through pregnancy, which was sometimes repeated. In three women who had nephrotomy,

¹ *Annales de Gyn. et Obstét.*, October, 1910, p. 674.

one had a miscarriage, one became pregnant twice to full term, and one three times.

A case of bilateral decapsulation is reported, the patient afterward becoming pregnant and going to full term.

Gallstones during Pregnancy and the Puerperium. Peterson¹ reports a fatal case of operation for gallstones in a patient six months pregnant, with a very thorough autopsy. In this case death resulted from failure in the secretion of urine, and hemorrhage into the peritoneal cavity in the region of the liver and gall-ducts. Two calculi were found in the hepatic duct in such a position that it was impossible to remove them at the operation. There was an acute hemorrhagic nephritis.

Peterson reviews the literature of the subject at considerable length, and concludes that gallstones are more commonly met with in women between the ages of twenty and twenty-five years, and that they are more common in women than in men. Unquestionably child-bearing has something to do with this frequency. In 542 patients in whom the gall-bladder was palpated during abdominal operations, gallstones were present in 64, or 11.8 per cent. The percentage of patients with gallstones who have borne one or more children was 75, in contrast to 65.7 per cent., in women who had no gallstones. About one-third of these cases showed the beginning of the attack at the fifth month of gestation at a time when the uterus is approaching the liver and the umbilicus, and beginning to crowd the intestines toward or upon the bile passages. In puerperal cases, the beginning of the attack in one-half was during the first seven days after labor. Chills and elevation of temperature associated with changes in the pulse are frequent when gallstones complicate pregnancy and the puerperal period, and 60 per cent. of pregnant patients having gallstones had jaundice. In puerperal patients, but 10 per cent. had jaundice.

In pregnancy, the operative mortality was 13.4 per cent.; in puerperal cases, 11.1 per cent. In both pregnant and puerperal patients more than one-half of the stones were in the gall-bladder alone.

As regards operation for gallstones during pregnancy, there seems no more liability in these cases to the interruption of pregnancy than with other abdominal operations. In choosing operation with these patients, that method should be employed which can be quickest carried out. If the condition of the mother permits, operation should be postponed until the child is viable. In these patients the diagnosis is not difficult, and jaundice is an especially reliable symptom, as it is more common in pregnant than in non-pregnant women who have gallstones.

The Local Tuberculin Reaction in Pregnancy and the Puerperal Period, and Its Diagnostic and Prognostic Import. Stern,² in Küstner's clinic in Breslau, examined 118 pregnant patients to determine the diagnostic

¹ Surgery, Gynecology, and Obstetrics, July, 1910.

² Zeitschrift für Geburtshülfe und Gynäkologie, 1910, Band lxvi, Heft 3.

value of the tuberculin reaction. He found that healthy women who were not pregnant reacted to the cutaneous test for tuberculosis in 65 per cent. of cases; while the conjunctival tuberculin test gave reaction in 14.5 per cent. During the first six months of pregnancy the cutaneous reaction is reduced to 54 per cent., the conjunctival to 7 per cent. From the seventh to the eighth month the cutaneous diminishes to 36.8 per cent.; in the ninth month to 30.8 per cent., and in the tenth month to 28.3 per cent. The conjunctival reaction was negative after the sixth month. In the puerperium the cutaneous reaction was again present in 67 per cent., and the conjunctival in 11 per cent.

It seems probable that this reduction, with these reactions during pregnancy, is caused by the lessened production of the tuberculous antibodies, and this fact would explain the unfavorable influence which pregnancy exerts upon tuberculous patients.

In endeavoring to ascertain the cause of this phenomenon, we must associate them with the lipid bodies of the placenta or the increased lipid contents of the blood. In view of the complicated conditions present in these cases, these reactions are of doubtful diagnostic and prognostic value. They may, in some instances, assist in confirming the results of physical diagnosis. In favorable cases it might be possible, by repeated cutaneous inoculations during the early months of pregnancy, to bring about changes in the organism which should increase the antibodies and thus furnish a more favorable basis for prognosis and indications for treatment. When the reaction ceases, the time has certainly come for the interruption of pregnancy. The prognostic significance of the reaction is greatest in the first half of pregnancy.

An effort was made, by studying the Arneth phenomena in the blood, to form some prognosis regarding tuberculosis complicating pregnancy, but the effort was without result.

Tetany Complicating Pregnancy. Frank¹ reports 5 cases of tetany complicating pregnancy, and believes from his investigations that the *cause of tetany* is a toxin probably derived from the connective tissue of the *ectoderm*. In its usual form the disease appears in each succeeding pregnancy, and between these periods the patient is free from attacks. Multiparæ are most often affected, and when primiparæ are attacked they are nervous and anemic individuals. The disease develops most often in the second half of pregnancy, and with succeeding pregnancies the symptoms grow more pronounced, the spasms attacking not only the upper extremities but the different groups of muscles, with increasing violence and with pain of increasing severity. In repeated attacks, the symptoms appear earlier in each pregnancy. The more rapidly the pregnancies succeed each other, the more pronounced is the disease, and this is especially true where complications, such as placenta prævia, occur, causing hemorrhage and trauma.

¹ Monatsschrift für Geburtshilfe und Gynäkologie, 1910, Band xxxii, Heft 4.

As a rule, tetany does not result fatally. In many mild cases the patient is so little inconvenienced that she does not come under the observation of a physician; while occasionally the disease is so severe as to produce a fatal result.

As regards *treatment*, in the milder cases the use of bromides is sufficient. In severe cases, and especially in those following the extirpation of an enlarged thyroid, the pregnancy must be interrupted to save the mother's life.

Schauta, who has had in his clinic large experience, does not consider tetany ordinarily a valid indication for the interruption of pregnancy.

Mechanical Ileus Complicating Pregnancy. Doane,¹ reports the case of a patient aged twenty-seven years, who suffered from marked constipation and had a cystic tumor of the left ovary adherent to the rectum, removed. When pregnancy afterward occurred, the patient suffered from nausea and abdominal distress, with constipation and distention of the bowels by gas, from the beginning. When five months pregnant the patient was suddenly seized with epigastric pain radiating to the right side of the abdomen, with nausea and vomiting of stomach contents and bile. Under morphine the symptoms subsided, to return in forty-eight hours, the vomiting having a fecal odor. Repeated enemata brought a slight movement from the lower bowel. The symptoms were again relieved by morphine, and on the fourth day the pain became excruciating, with pronounced retching. There was no passage of gas or fecal matter from the bowel. The upper abdomen was markedly distended, with a rapid, weak pulse.

Upon examination, a distinct mass could be palpated above the five months' pregnant uterus near the umbilicus. The stomach and upper intestine were evidently distended. There was some bulging in the cul-de-sac of the vagina, and the rectum was empty. Irrigation of the bowel and stomach produced no improvement, and the leukocytosis became as high as 18,500. The urine showed a distinct reaction for indican.

Upon operation, the omentum was adherent to the peritoneum and the intestines were pressed upward by the pregnant womb. There were dense adhesions, evidently old. The mass palpated above the womb was found to be a gangrenous loop of small intestine forming a typical mechanical ileus, a thick band passing from the free surface of the ileum about 20 cm. from its junction with the cecum, then looping about the intestine, and apparently attached to the posterior wall of the abdominal cavity. The occluded bowel with its mesentery was enormously distended and gangrenous. The serous covering of the intestine, not occluded by the band, was coated with a fibrinous exudate and was dark in color. The band was severed and the gangrenous

¹ Journal of American Medical Association, October 29, 1910.

intestine with its mesentery, 30 cm. long, was clamped and removed. An end-to-end anastomosis was made and the edges of the mesentery were brought together. The abdomen was closed with a large cigarette drain to the point of the ileus. On the eleventh day after operation, the patient expelled a five and a half months fetus. She gradually made a perfect recovery.

A table of 48 cases of ileus complicating pregnancy is appended.

Varicose Veins Complicating Pregnancy. Cramer¹ reports the interesting case of a primipara eight months advanced, who passed through her first pregnancy and puerperal period normally. At this time there was no evidence of enlargement of the veins. In the fourth month of her second pregnancy she complained of severe and dragging pains in the groin.

Upon examination, at the external ring a swelling could be detected, which was increased by standing and disappeared when the patient was reclining. The veins about the region were dilated. The external ring was not penetrable by the finger.

The patient was ordered to apply a bandage, but two weeks afterward reported that the pain had become much more severe, and upon examination the enlargement of the veins was much greater. An effort was made to apply pressure, and the patient was ordered to remain recumbent. Four weeks later, when the patient had arrived at the sixth month, she applied for hospital care, as her symptoms had become more severe. The tumor had also increased in size.

The operation was performed by making incisions parallel to Poupart's ligament on each side at the external ring. It was necessary to use caution to avoid wounding enlarged veins. The external spermatic was as large as a thumb and extended into the canal. A considerable portion of the vein was ligated and excised and the sac brought accurately together. The patient made an uninterrupted recovery; pregnancy went to term; the confinement was spontaneous; and the puerperal period was without complications.

Osteomalacia Complicating Pregnancy. Marquis² reviews the literature of the subject, and reports cases under his own observation, arriving at the conclusion that a condition of decalcification in the skeleton during pregnancy, caused by ovarian disturbance, suprarenal lesions, or unknown factors, seen in cases of rapidly repeated pregnancies, with exhaustion of the calcium supply of the body, is practically one of the three phases of osteomalacia.

In order to diagnosticate the condition, the ingesta, the feces, and the urine must be examined, and based upon this, the dosage of calcium salts required by the condition of the blood must be ascertained.

¹ Monatsschrift für Geburtshülfe und Gynäkologie, 1910, Band xxxii, Heft 5.

² L'Obstétrique, June, 1910.

Epilepsy Complicating Pregnancy. Sachs¹ reports a case of epilepsy complicating pregnancy, with a fatal termination. Autopsy showed none of the lesions characteristic of eclampsia. No visceral lesions could be found to account for death, and the death was referred to the epilepsy alone. The patient had severe and repeated convulsions and the six months' pregnancy was terminated artificially, but without avail. The patient had considerable hemorrhage, although the uterus contracted well, and this was controlled by the use of Momburg's bandage.

Sachs reviews other reported cases, but was unable to find in the literature a case of the status epilepticus complicating pregnancy which was favorably influenced by the interruption of gestation. In some of these patients, the occurrence of pregnancy seems to improve the general health. The interruption of pregnancy is justifiable only in those patients in whom the epilepsy first appeared during the pregnant condition. The induction of labor in these patients occasions such irritation that during the status epilepticus it should not be undertaken. In cases in which the patient has occasional convulsions, if the status epilepticus has not developed, pregnancy may be interrupted for good reasons, without injury.

The *differential diagnosis* between *epilepsy* and *eclampsia* is often interesting. In epileptics, the urine is not, as a rule, pathological.

A case is cited in which an epileptic patient, pregnant, had nephritis, and in which the diagnosis of the essential condition was difficult. In a differential diagnosis some value is assigned to the examination of the blood by cryoscopy.

The Relationship between Myoma of the Uterus and Conception. Goetze² reports a case of pregnancy complicated by myoma of the uterus, in which operation was performed. He has examined records of 1500 gynecological patients in Henkel's clinic at Greifswald, finding 122 patients, or 8.1 per cent., who had uterine myomata. Of these women, 105 were married, and 21 per cent. of them were sterile. Among 730 married patients having some lesions of the generative tract, including myomata, sterility was present in 6.95 per cent.

The average age of those patients having myomata, and remaining sterile, was forty-one years. The average time of marriage, 14.5 years. There seemed, without doubt, a relation of some sort between the occurrence of myomata and sterility in these patients.

In further analyzing these cases, he found that small subserous fibroids did not in the least interfere with conception. If they increase in size they may prove a hindrance, although such tumors of larger size do not invariably prevent conception. Submucous tumors give the most unfavorable prognosis, especially when there is great alteration in the

¹ Monatsschrift für Geburtshilfe und Gynäkologie, 1910, Band xxxii, Heft 6.

² Zeitschrift für Geburtshilfe und Gynäkologie, 1910, Band lxvi, Heft 2.

endometrium with severe hemorrhage. Radical operation is here indicated, especially as many of these patients have had repeated pregnancies.

Interstitial myomata prevent conception in proportion to the alterations which they have produced in the endometrium. Myomatous tumors of the cervix hinder conception more than those of the body of the uterus, and increase the danger of abortion. If there be no other lesion preventing conception, and it is possible to remove the myomatous tumor, this will be followed by a much better chance of pregnancy, and this probability will be increased the less serious and extensive is the operation performed, the less the alteration in the endometrium, and the earlier the diagnosis of myomatous tumor is made. In a patient, aged thirty years, with interstitial myomata of considerable size, conception is exceedingly improbable.

Pregnancy and Labor Complicated with Cancer of the Cervix. Beckmann¹ reports a case of labor complicated by cancer of the cervix in which the child was delivered by a transverse incision through the anterior vaginal wall, with a longitudinal incision through the carcinomatous cervix. The forceps was then applied and the child delivered. The placenta was removed and the uterus extirpated through the vagina.

The broad ligaments were sutured, the stumps fixed in the wound, and the vaginal wall and abdominal tissue closed. The patient made a good recovery from the operation.

In reviewing this condition, he finds various estimates as to its frequency: Winckel, 1 in 2000; Stratz, 1 in 2547; Sutugin, 1 in 4500; Sarwey, 1 in 714; Heid and Trotta, somewhat less than 1 in 2000. In percentage, this is practically from 0.95 to 0.07 of 1 per cent.

In estimating the frequency of pregnancy among patients who already had cancer, Wertheim, in 600 cases of cancer of the cervix, observed 6 cases of pregnancy; Orthmann found pregnancy in 5.17 per cent. of patients having cancer of the cervix; Glockner in 1.74 per cent., and von Franqué in 10.99 per cent.

The comparative rarity of cancer of the cervix in pregnancy is partially explained by the fact that carcinoma develops after the usual age at which pregnancy occurs. The majority of observers find that pregnancy hastens the development of cancer of the cervix.

Spencer and Graefe saw favorable changes in carcinoma of the cervix after the birth of the child. In Graefe's case, a second pregnancy supervened and the patient did not succumb until three and three-quarter years after the original diagnosis of cancer had been made. Others believe that in the puerperal period cancer increases rapidly.

When one tries to estimate the influence of carcinoma upon pregnancy, the data is confusing. In a previous publication the writer comes to

¹ Zeitschrift für Geburtshülfe und Gynäkologie, 1910, Band lxvii, Heft 2.

the conclusion that carcinomas influence pregnancy very little, and that but one case in twelve comes to abortion; while Hegar reckoned eight normal births to one abortion. Pinard and Grimond, on the contrary, believe that cancer causes the interruption of pregnancy in from 23 to 33 per cent. Cases are reported in which cancer has caused rupture of the uterus during labor, and placenta prævia has been reported as a complication in pregnancy by Sarwey and Frank.

Cancer in the cervix is a mechanical obstruction to dilatation and expulsion. Prolonged labor, from seven to nineteen days, has been reported by various authors. In Gobiet's case, abdominal extirpation of the uterus was performed seven days after labor began. As a consequence of this condition, extensive lacerations of the cervix and lower uterine segment had been observed. But 6 ruptures in 60 labors, and 11 in 180 cases, have been reported.

Von Franqué reports a case of rupture of a carcinomatous uterus in spontaneous labor. In some cases, prolonged labor in cancer causes hemorrhage, septic infection, and embolism. Delivery through the vagina, with cancerous cervix, is attended by dangerous complications. Spontaneous birth can only occur when some portion of the cervix remains uninfiltated by the malignant growth. When the cancerous tissue has extended throughout the length of the cervical canal vaginal delivery is especially difficult. In some cases of long-continued labor, a cancerous portion of the cervix may become necrotic and be expelled, and in these cases the puerperal period is usually afebrile. Prolongation of labor with these patients often results in the death of the fetus through birth pressure. Before the development of obstetric surgery, among 126 such cases, 19 died undelivered; in another series, among 180 cases, 13 died undelivered; and in another group of 165 cases, 6 died undelivered.

Labor may be entirely missed, as in the case reported in which pregnancy persisted seventeen and one-half months. The prolongation of pregnancy to eleven months has been observed. Death has occurred one month after labor pains ceased, without delivery; and death occurred after a patient had labor pains for one month.

In some of these cases, the fetus had died and the patient's condition did not justify operation.

The prognosis of pregnancy complicated by cancer of the cervix evidently depends upon the *treatment* employed. Without radical operation, but with spontaneous delivery, or artificial delivery through the vagina, the *mortality rate* for the mother varies from 14 to 57 per cent.; for the child, from 21 to 70 per cent.

The adoption of *Cesarean section* in its various forms has reduced maternal mortality to 22 per cent. When a radical operation is done through the vagina in all different months of pregnancy, including vaginal Cesarean section, during the latter months the mortality rate

for the mother varies from 4.4 to 18 per cent., and for the child from 27 to 44 per cent.

Radical operation by the abdominal method, with abdominal Cesarean section in the last months of pregnancy, shows a reduction in maternal mortality from 38 per cent. to *nil*, and for the child from 22 per cent. to *nil*.

The author has collected 32 vaginal radical operations, including his own, with a maternal mortality of 6.2 per cent.; among these patients 14 children were viable, and delivered by vaginal Cesarean section without mortality. He has collected 42 recent operations by abdominal section, with a maternal mortality of 6.97 per cent., and no fetal mortality after viability.

A great improvement is evident in the *results obtained* by modern operative procedures. The chance for the child is better by abdominal than by vaginal section, and hence the abdominal operation is to be preferred.

When the permanent results of these operations are studied, in 32 cases of vaginal operation collected by the author, he was able to trace the subsequent history of the patient in 14. One patient was free from return eleven months after the operation; one a year after; one each one and one-third, one and one-half, and four and three-quarters years; and 2 after two and one-half years. In 7 patients the malignant growth returned in five, six, eight, eight, eleven, and fifteen months respectively; and in 1 case after two and one-half years.

Among the cases operated upon by the abdominal method, 12 were subsequently traced. Without return, were 8, respectively one, one and one-sixth, two, two and one-half, two and one-half, four, four, and five years after operation. A return was found in 4 patients after four years and four months, and 1 in two and one-half years.

While there does not seem to be much difference between permanent results in vaginal and abdominal operations, the abdominal operation can be more thoroughly and carefully performed, and should be preferred. In cases complicated by septic infection, the obstetrician may operate through the vagina, or remove the entire uterus through the abdominal route without opening it. In operating, it is found possible to remove the cancerous uterus very thoroughly because of the loosening of the connective tissue incident to pregnancy; so more advanced cancers may often be successfully operated upon than in non-pregnant patients. In cases in which profuse and uncontrollable hemorrhage occurs, the free use of the Paquelin cautery may stop the bleeding. In Beckmann's operation, he applied tincture of iodine freely to the carcinomatous surfaces.

Ovarian Tumor Complicating Pregnancy, Labor, and the Puerperal State, with a Report of Eight Recent Cases. Marshall¹ has investigated

¹ Journal of Obstetrics and Gynecology of the British Empire, February, 1910.

the frequency of ovarian tumor complicating pregnancy, and quotes McKerron's estimate of 1 in 2500 pregnancies. Monro Kerr, in an extensive experience up to 1906, had met with but 12 cases, but since then he has operated upon 5 others. His estimate of 1 in 1500 is thought too high. At the Berlin Frauen klinic, there were 5 in 17,832 births, or 1 in 3566, and at the New York Lying-in Hospital, 1 in 4666.

The average probably lies between Munro Kerr's estimate and those of Berlin and New York.

Marshall reports 5 cases. In the second case, a patient in her third pregnancy, the diagnosis was made at the ninth month, and operation was advised, but refused. At the latter part of pregnancy a tumor could be readily diagnosticated at the pelvic brim. This was pushed up into the left hypochondrium, and operation advised. The patient declined, and the birth of the child was spontaneous.

During pregnancy, Marshall believes that tumors should be removed so soon as the diagnosis is made. With expectant treatment, the maternal mortality is estimated at 10 per cent., abortion occurring in 17.5 per cent. Operative treatment gave a mortality of 3.3 per cent., with abortion or premature labor after operation in 17.5 per cent. The most recent statistics show a maternal mortality ranging from 4.3 per cent. to 0.47 per cent.

Marshall collected 137 cases, published since 1903, operated upon during pregnancy, showing one maternal death following the removal of a suppurating cyst, and an abortion rate of 15.1 per cent.

Dermoids, which form 25 per cent. of ovarian tumors in pregnancy, are especially dangerous, as they are usually low in the pelvis, are prone to suppurate, and should they rupture, set up infection. During pregnancy the abdominal route is selected, and if the abdomen is opened over the left rectus muscle, the muscle turned outward, and the wound afterward closed in four overlapping layers, the growing uterus will not distend the scar. Through-and-through suturing in the middle line should not be done, as the incision may burst open with a fatal result. Only when an ovarian tumor during pregnancy is found densely adherent would it be necessary to perform Cesarean section in addition. If the uterine muscle is injured, suturing will suffice, but if the fetal sac be penetrated, hysterectomy is indicated. To avoid abortion, morphine may be given, but it is also important to avoid mass ligaturing of the tumor pedicle, to tie the vessels separately by under-suturing, disturbing the uterus as little as possible, and protecting the uterus and abdominal cavity by a large pad wrung out of hot saline solution.

Ovarian tumor complicating labor is given a maternal mortality of 24.5 per cent. with a fetal mortality of nearly one-half.

Marshall collected 26 cases with his own, in which reposition was tried six times, but failed in four. Forceps was used twice, bursting the tumor once, but without a bad result. In the second case, the tumor

was driven through a rent in the posterior vaginal wall, with a fatal result to the mother. Version was done four times, with the loss of three children and one mother. In the latter case, the tumor had been diagnosed two and one-half months previously, and a waiting policy advocated. Section was performed in 18 cases, abdominal ovariectomy in 7, vaginal ovariectomy in 4, Cesarean section in 7 cases. One mother died following Cesarean section after two hours had been spent in the effort to deliver with forceps before the surgeon was called in. One child was lost through pressure upon the cord.

Traub's¹ paper reports 61 cases of reposition, with the deaths of 9 mothers and 8 children; 56 cases of puncture, with the deaths of 16 mothers and 10 children; and 16 cases of ovariectomy during labor, with no maternal deaths and the loss of one child.

When an ovarian tumor is abdominal in position, and labor develops, the majority of opinion at present is that labor should be allowed to proceed without interruption if the tumor does not prevent the passage of the child. If the tumor obstructs labor, but the patient is in good condition, ovariectomy may be delayed until the end of the first stage, and the child delivered immediately afterward by forceps, as was done in a case reported by Spencer. When labor is left to nature, it may be necessary to aid by dilating the cervix, using forceps or delivering the placenta manually.

Great care must be exercised during all manipulations to avoid injuring and rupturing the cyst. If the patient does well, the tumor should be removed early in the puerperal period; but should a cyst have ruptured, or have burst, or should torsion of the pedicle occur, the tumor should be removed as soon as possible.

Marshall reports the case of a primipara having a large dermoid filling the pelvis. During the first stage of labor section was performed, the tumor delivered with some difficulty, and removed. The blood-vessels were ligated on each side with catgut, and the wound in the broad ligament closed by continuous catgut suture. The uterus was replaced, and the abdomen closed. Labor progressed favorably, and the patient was delivered by forceps as soon as the os was fully dilated. The patient made a good recovery.

Dermoids furnish the most dangerous complication for labor. Reposition is the best of all treatment as a temporary expedient, care being taken to avoid injury to the tumor and rupture. Attempts to deliver through the vagina before the tumor has been removed are most disastrous, and usually bring about a fatal termination. There should be no delay in such a case. Operation should be done as soon as a thorough examination has been made. If the attending physician cannot get skilled help and cannot attempt section himself, puncture

¹ Zentralblatt für Gynäkologie, 1907, p. 1448.

or vaginal incision may be done to lessen the size of the tumor and permit the labor.

By far the safest treatment is *ovariotomy* through the abdomen, the vaginal route being chosen only if the tumor is cystic, free from adhesions, and with a long pedicle which can be easily and securely controlled.

In view of the uncertainties of vaginal section, abdominal section is to be preferred. Cesarean section should be limited to cases in which the removal of the tumor would be attended with great difficulty, or when it may be impossible.

Marshall reports 5 cases of ovarian tumor complicating the puerperal period. In 1, operation was performed three months after the birth of the child; in 2, four months after; in 1, five and one-half months after; and in another, seven months after labor. These patients recovered in good condition. In 4 out of the 5 cases it is noted that there were adhesions, many of them dense and difficult to separate. One of the patients had been tapped twice, and at operation a cyst was found considerably adherent to the anterior abdominal wall.

Marshall's experience, and that of others, shows how frequently complications develop in these cases during the puerperal period.

Patton¹ collected 95 cases treated expectantly, with rupture of a cyst in 10, torsion of the pedicle in 25, torsion and hemorrhage in 3, suppuration in 6, and peritonitis in 3; 21 of these patients died.

It is difficult to find a reasonable excuse for delay in the removal of an ovarian tumor complicating pregnancy, labor, or the puerperal period. We believe the effort at reposition is dangerous and unwarranted, and should not be made. The question of Cesarean section must be left to the judgment of the operator, but we should certainly consider it preferable to a difficult forceps delivery or version. When the tumor is adherent or suppurating, and the uterus is wounded in its removal, ovariectomy followed by Cesarean section and hysterectomy with drainage, are indicated.

Fibroids Complicating Pregnancy. At the last meeting of the British Medical Association, section on Gynecology and Obstetrics, this subject was discussed in an opening paper by Tate.²

Tate draws attention to the dangers arising in pregnancy through torsion of the pedicle of a fibroid tumor and necrobiosis and increase in the size of the tumor. Abortion occurs in 25 per cent. of these patients, and the possibility of complications following abortion caused by the presence of the tumor, cannot be denied. If such patients are examined thoroughly during pregnancy, those should be recognized in which vaginal delivery would be impossible. There is an added risk of postpartum hemorrhage in these patients. During the puerperal period the fibroid may be forced out of the uterus into the vagina,

¹ Surgery, Gynecology, and Obstetrics, 1906, vol. iii, p. 414.

² British Medical Journal, October 22, 1910.

and in these cases the tumor may usually be removed without difficulty. Fibroids sometimes undergo toxic changes after labor, and suppuration and sloughing may occur.

Tate considers that, as a rule, fibroids complicating pregnancy do not call for treatment during pregnancy. The induction of abortion or premature labor should not be undertaken, owing to the risk of infection and hemorrhage. It is believed that myomectomy is the operation of choice, during pregnancy, as it frequently enables the pregnancy to proceed to a successful issue.

In the discussion, Routh had never removed a uterus during pregnancy because fibroid tumors existed. Myomectomy should be the operation of choice, and every precaution taken to allow the pregnancy to go to full term. He thought that hysterectomy should be declined before viability.

Spencer had seen a considerable number of such cases, and had performed Cesarean section three times for uterine fibroids, and once for ovarian fibroid. He had not found it necessary to remove the uterus because septic submucous fibroids were present. He had seen but two patients die from fibroids complicating pregnancy or the puerperal period. One had septic peritonitis from torsion of the pedicle of a subperitoneal tumor. The patient died, although operated upon promptly. The other patient died from intestinal obstruction caused by the occlusion of the intestine by two subperitoneal tumors.

Doran believed that when the fibroid was in or near the fundus, operation was rarely indicated. When near or in the lower uterine segment, it was still possible for safe delivery to occur; but when the uterus was filled with fibroids of all types, it should be removed in early pregnancy. In such operations the ovaries should be saved, if possible, and the cervix should not be removed except for some positive indication.

Martin had seen severe vomiting caused by a small interstitial fibroid complicating pregnancy. Acute red degeneration of the fibroid might develop suddenly and make myomectomy imperative. Myomectomy during pregnancy is often more difficult and dangerous than hysterectomy, but it should be undertaken with the hope of avoiding abortion. A fibroid may be so bruised and lacerated during delivery as to become necrotic afterward and require removal during the puerperal period.

Wallace reported the interesting case of a patient, aged forty-five years, four months advanced in pregnancy, who was suddenly taken with symptoms of torsion of the pedicle in an abdominal tumor. Upon operation, a large edematous fibroid was found at the fundus uteri. During its removal the uterine wall was so deeply opened that the decidual tissue was exposed. The patient recovered, and was

subsequently delivered at term of a healthy child. There was no tendency to abortion during her recovery.

Lea called attention to the dangers of fibroids complicating parturition, and in 8 cases he had found that operation was required during pregnancy in 5, and during the puerperal period in 3. In 7 of these, hysterectomy was done, and in 1, myomectomy. In 7 cases, the tumors showed degenerative or inflammatory changes.

A bacteriological examination was made four times; the 2 cases of red degeneration during pregnancy giving sterile cultures; while in another extirpated after delivery, diplococci were found; and in a suppurating subperitoneal myoma removed by vaginal hysterectomy, streptococci and the colon bacilli were present.

He believed that, in infection in all tumors after delivery, abdominal hysterectomy was indicated. His patients had made good recoveries.

He would limit myomectomy in pregnancy to tumors with a distinct pedicle.

Extramembranous Pregnancy. Nolle¹ reports the case of a patient pregnant for the third time, who consulted him because she had a clear and watery discharge from the uterus, occasionally mixed with blood. This occurred several times at night, and it was evidently not a discharge of urine.

Upon examining the patient, a normal pregnancy seemed to be present, the cervix being dilated somewhat externally, while the internal os was undilated. The finger, after examination, was covered with a thick brownish yellow or dirty-brown material. The patient was given vaginal douches of a weak formalin solution, and some days afterward was admitted to the clinic with a history of hemorrhage. Upon examination, bright blood was not present, but the same brownish discharge had greatly increased. This ceased with rest in bed, and vaginal douches of a weak formalin solution, and the patient was again discharged.

She returned a month later with evident labor pains. She stated that she had fallen, and that after this water had again escaped. Labor proceeded normally, and a living but premature child was born. During labor there was no amniotic liquid. The placenta was readily delivered by Credé's method, half an hour after the birth of the child. The child lived but an hour, dying of apparent weakness. The patient made a good recovery.

Upon examining the placenta, upon the fetal surface along the entire border was found a white fibrinous ring from three-quarters to one and one-half inches wide, which was somewhat higher than the remaining surface of the placenta. From the inner border of this ring there was developed a thin attenuated material which had in the middle, at one

¹ Zentralblatt für Gynäkologie, 1910, No. 10.

side of the centre, an opening as large as a silver quarter. Through this protruded the umbilical cord. The width of this layer from the fibrinous ring to the opening, was from 2 to 6 cm. The border of the opening was smooth, without laceration, and somewhat thickened. Both of the membranes were firmly united, but could be easily separated from the newly developed mass upon the fetal surface of the placenta. When the borders of the opening were drawn upward they formed a sac containing 100 grams.

The explanation of the case is one of extramembranous pregnancy. An effort had been made to perform criminal abortion and the membranes had been ruptured. Following this the fetus had been discharged, but had developed outside its membrane.

A Case of Peritoneal Pregnancy. Hammacher¹ reports the case of a pregnant patient, who had sudden severe abdominal pain followed by collapse. Upon opening the abdomen, blood escaped under considerable pressure, the right tube ruptured, but the right ovary was normal. The ruptured tube was removed, the patient making a good recovery.

Upon examining the specimen, it was seen that the rupture was not total; and on microscopic examination it was found that signs of changes characteristic of pregnancy were present in the serous and subserous layers of the right tube. Villi of the chorion, syncytium, and trophoblasts could be identified on the serous surface. In the lumen of the tube there was no sign of the characteristic changes of pregnancy. The mucosa, submucosa, and muscular tissues, were perfectly normal. The fimbriated extremity was normal; the uterus and the remaining tube and ovary were normal. There was a short and almost microscopic accessory tube opening freely into the abdominal cavity, which showed in its lumen and epithelia no sign of pregnancy. The most of the tissues characteristic of pregnancy were found $2\frac{1}{2}$ mm. from the opening of this tube. It was evident that a primary abdominal pregnancy existed, which had developed upon the serous surface of the right tube and upon the peritoneum.

Ferroni² reports the interesting case of a multipara, who at operation was found to have an extrauterine pregnancy associated with tuberculous lesions and adenomyoma of the tube.

Lobenstein³ reports 100 cases of fibroids complicating pregnancy in the New York Lying-in Hospital. He reports a case of incomplete abortion complicated by fibroids with hemorrhage, for which it was thought best to do hysterectomy. This the patient would not permit, and the cervix was incised anteriorly and the ovum thus removed. The uterus contained two large fibroids, one on the posterior wall low down, the size of an infant's head; the smaller was the size of a

¹ Archiv für Gynäkologie, 1910, Band xcii, Heft 2.

² Annali di Ostetricia e Ginecologia, 1910, No. 1.

³ American Journal of Obstetrics, January, 1911.

goose egg on the lateral wall. The patient afterward consented to hysterectomy, as her temperature rose, and the lochial discharge was abundant. She made a good recovery.

He also reports cases illustrating the *dangers of myomectomy*. In one operation there was considerable hemorrhage followed by abortion. In another, the patient recovered from the myomectomy and was delivered at term, when it was found that the uterine body still contained several good-sized tumors. In several cases, a large tumor remained after labor in such a position that it caused the patient very little discomfort. In 3 cases, during labor a fibroid tumor was drawn up spontaneously above the pelvis, and the child descended. In 2 cases, a large fibroid caused no symptoms, and delivery was effected by version and by forceps. In 2 cases, Cesarean section was necessary with hysterectomy. In 5 cases, suppuration in the tumor occurred in the puerperal period, death occurring in one case.

He concludes that fibroids predispose to sterility, to abortion, and to difficult labor. When abortion does not occur, it is best to let the case alone, for delivery is often accomplished in a very remarkable manner. During delivery, all possible wounding of the tumor should be avoided. In the puerperal period, if symptoms of gangrene develop, operation should be done at once.

Apical Pregnancy. Under this title, Grad¹ reports the case of a patient who believed herself pregnant; she was constantly nauseated, and a week previously had considerable vaginal hemorrhage. She had had cramp-like pains and feared abortion, having had one several years before.

Bimanual examination revealed an enlarged uterus, exceedingly tender to the touch. On the day following, uterine hemorrhage occurred, with considerable bearing-down pain and some rise of temperature. On the following day, under chloroform, the uterus was irregularly enlarged, the left cornu feeling like a fibroid tumor. A sound introduced into the uterine cavity showed three and one-half inches. The cervix was stretched and the uterine cavity explored with the finger, but was found practically empty.

The diagnosis of ectopic gestation complicated by a fibroid uterus was made, and operation was advised. To this the patient did not give her consent, and forty-eight hours afterward she had sharp uterine hemorrhage with labor pains. Later she expelled a small fetus without membranes. She was again anesthetized, when, with a finger in the uterus, a large cavity at the left cornu was entered and a quantity of membranes removed, when the uterus was packed. Three days afterward the patient had a chill and sharp rise in temperature, and upon examination, retained membranes were found in the uterus, which were removed, followed by recovery.

¹ American Journal of Obstetrics, January, 1911.

The case had been one of pregnancy in the uterine cornu with a spontaneous discharge of the fetus and retention of its membranes.

Rupture of the Uterus. Issel¹ reports 7 cases of rupture of the uterus treated by operation; 4 of these cases were treated by total extirpation, leaving the tubes and ovaries uninjured and healthy; 2 of these patients died from septic infection, and 1 from acute anemia.

In one of the cases which recovered, there was found a vesicovaginal fistula which was so high up that it was thought best to remove the right kidney. The patient made a good recovery.

One patient died immediately after rupture of the uterus before she could be operated upon, and her child was immediately delivered by forceps.

Another patient had a laceration of the uterus transversely across the cervix, making a communication between the vagina and the abdominal cavity. This laceration was closed and the uterus left. The patient had a severe attack of infection, but recovered.

In one case, the uterus was amputated above the vagina and the right tube and ovary were removed. This patient recovered.

Two successful cases of total extirpation of the uterus for rupture are added to the preceding, making in all 8 cases treated by operation, of which 6 recovered, making 75 per cent. of recoveries.

As regards the choice of operation, Klein's statistics show that abdominal section, with suture of the laceration, gives 59 per cent. of recoveries; supravaginal amputation after rupture, 55 per cent. of recoveries; and abdominal total extirpation of the uterus after rupture gives 76 per cent. of recoveries.

Incomplete and Complete Rupture of the Uterus followed by Recovery. Stowe² reports the case of a patient in prolonged labor under the care of a midwife, who attempted to press the head out of the uterus. The patient had sudden pain and shock.

Upon examination, the abdomen was tender to pressure, the patient complaining of sharp pain over the left iliac fossa. There were no heart sounds, the fetal head was flexed, the occiput anterior. A dead fetus of moderate size was easily removed by forceps.

Upon examination, the left wall of the uterus was torn just above the vaginal fornix, extending upward and slightly posterior. The rupture was incomplete, completely closed by the tissues of the broad ligament, and filled with blood clot. The tear was packed with lysol gauze and the uterus and vagina firmly packed. The gauze in the broad ligament could be plainly palpated through the abdominal wall. The gauze was removed on the following day, the patient given ergot and hydrastis, placed in the Fowler position, and the lower abdomen covered with ice bags. She made a perfect recovery in three weeks.

¹ Monatschrift für Geburtshülfe und Gynäkologie, 1910, Band xxxi, Heft 4.

² Surgery, Gynecology, and Obstetrics, April, 1910.

The second patient was a primipara who had several attempts made, without success, to deliver her. Upon admission to the hospital she was found to have a flat, generally rachitic pelvis. The fetus was above the inlet and mobile, the cord had prolapsed and was pulseless. The head was perforated and the Karl Braun cranioclast applied, the external blade passing posteriorly. The blades failed to lock, and as they were withdrawn a coil of intestine was found within the cervix.

Upon examination, a circular rupture was discovered in the posterior wall of the uterus above the external os admitting three fingers. The bowel had not been separated from its mesentery. The patient collapsed, when it was thought impossible to perform section. The intestine was replaced, and a second effort made to apply the cranioclast, but it was impossible to secure a firm hold. Version and extraction were performed, with removal of the placenta, replacement of the bowel, and packing with gauze.

The patient was treated as in the preceding case; the bowels moved spontaneously, and the stools contained blood clots. The patient gradually recovered.

Spontaneous Rupture of the Uterus. Wilson¹ reports the case of a multipara, who during spontaneous labor had sudden cessation of pains with recession of the head. Upon admission to the hospital she was in moderate collapse, with bleeding. The fetus was detected beneath the abdominal wall.

Upon section, the abdominal cavity was filled with blood, the dead fetus and placenta were removed free from the abdomen, and a complete rupture of the uterus and vagina was found to the right and posteriorly, involving the lower segment and extending into the broad ligament. The uterus was amputated at the cervix, the operation being embarrassed by hemorrhage from the inferior vesical and middle hemorrhoidal arteries in the vaginal laceration. Gauze packing, in addition to sutures, was employed.

The patient's convalescence occupied fifty-seven days, during which time she passed through an embolic pneumonia from infarction on the third day. She ultimately made a good recovery.

Munro Kerr,² in addition to 14 cases of rupture of the uterus, reports 3 others. In the first, forceps had been tried without success, followed by collapse. Upon section, the head was still in the uterus and the trunk free in the abdominal cavity. It was difficult to extract the head, and complete hysterectomy was performed, draining the left parametrium by tube and gauze. The patient made a good recovery. The child weighed twelve and one-half pounds.

The second case was that of hydrocephalus. The head was perforated and easily extracted. Upon introducing the hand to remove the

¹ American Journal of Obstetrics, January, 1911.

² British Medical Journal, October 22, 1910.

placenta, a tear was discovered extending the length of the whole left side. The abdomen was opened, and the tear found to be incomplete. The peritoneum was intact. The abdomen was then closed and the tear packed with gauze through the vagina. The patient died of shock five days afterward.

The third case was one of transverse position, with impaction of the shoulder and prolapse of the arm. Internal version had been attempted. Upon opening the abdomen, a large complete tear involving the cervix and lower uterine segment was found. Hysterectomy was performed and the left parametrium drained. The patient made an excellent recovery.

Kerr believes that cases of incomplete rupture do well with gauze drainage through the vagina. In his own experience he has had the best results in complete rupture by complete hysterectomy, draining whichever broad ligament is lacerated, and completely covering the lower part of the pelvis with peritoneum. The drain used is a thick, rubber tube brought out through the vagina and loosely surrounded by gauze. This is left for three or four days.

Tobiaszek¹ reports the case of a multipara with contracted pelvis and a true conjugate of 8 cm., who had been long in labor and was admitted in an exhausted condition.

Upon examination, two round and hard masses could be felt in the abdomen, one upon the right side, which seemed to be the contracted uterus; on the left side, the fetal parts could be made out through the thin abdominal wall. The intestines seemed distended, especially at the upper part of the abdomen. Fetal heart sounds could not be heard.

Upon vaginal examination, there was complete dilatation, the anterior lip of the cervix being swollen and compressed between the symphysis and the head. There was a posterior presentation of the left parietal bone. The sagittal suture was transverse near the pubis. The head was extracted without much difficulty by forceps, and the placenta removed by the hand. It was then found that the body of the uterus in firm contraction was upon the right, but separated from the cervix by a transverse tear. On the left side could be felt the coils of intestines. The laceration extended into the left side of the vagina. The entire uterine laceration was shaped somewhat like the letter "T." The intestine and omentum prolapsed into the vagina. These were replaced and with the aid of a speculum the rent into the peritoneal cavity and the lower uterine segment were tamponed with vioform gauze. The patient was given stimulants hypodermically. The patient's recovery was complicated by bronchopneumonia and an attack of acute delirium, during which she sprang out of bed and attacked a neighboring patient. In spite of this, she finally recovered.

¹ Zentralblatt für Gynäkologie, 1910, No. 5.

The second case was that of a multipara, with a flat pelvis and a true conjugate of $8\frac{1}{2}$ cm. She was admitted to the hospital with prolapse of the cord, which had ceased to beat. She was delivered by difficult craniotomy, in which it was necessary to remove the fetal bones separately, because of the size and hardness of the head.

Upon introducing the hand to remove the placenta, a laceration on the left side of the lower uterine segment was found 7 cm. long, which extended to the peritoneal covering of the uterus. The cervix was torn on both sides. The cervical lacerations were closed by suture and the rupture tamponed with vioform gauze, and an ice bag placed over the uterus. The patient's convalescence was complicated by a sudden profuse uterine hemorrhage, occurring at night, without apparent cause. In spite of this, she recovered. The lacerated cervix had healed before she left the hospital.

Pohl¹ reports the case of a multipara who was delivered of twins, under the care of a physician, who found it necessary to remove the placenta by hand. This was followed by profuse hemorrhage. On the next day, the abdomen became distended, flatus was not expelled, the patient vomited, and had several chills.

Upon examination, the abdomen was greatly distended, and on the right side the cervix was considerably torn; forty-seven hours after labor, the abdomen was opened through the right rectus muscle. A large mass of clotted blood was found in the abdomen, and an incomplete rupture of the uterus on the right side, extending into the lower segment and cervix. A supravaginal amputation of the uterus was followed by drainage. The patient made a gradual recovery.

The writer quotes Petren's statistics of 754 cases of rupture of the uterus collected in the last thirty years, with 208 recoveries—32 per cent.—giving a mortality of 68 per cent.

Polak² reports the case of a patient who had face presentation and early rupture of the membranes, and who was delivered of a child weighing $8\frac{1}{2}$ pounds by internal podalic version. The placenta was removed by Credé's method. After delivery the patient felt faint, with persistent pain in the lower abdomen. At evening she collapsed and was sent to hospital.

Upon examination, there was a peritoneal laceration and a deep tear on the left side of the cervix extending up the uterine wall into the peritoneal cavity. The abdomen was opened under morphine and hyoscine and a small amount of chloroform-oxygen anesthesia, and a rapid supracervical hysterectomy was performed. A large quantity of blood was found in the abdomen; the left uterine artery had been torn away and was still oozing. Drainage was employed.

On the second day after operation, the patient developed acute

¹ *Monatsschrift für Geburtshülfe und Gynäkologie*, 1910, Band xxxi, Heft 5.

² *American Journal of Obstetrics*, February, 1910.

pulmonary congestion at both bases and dilatation of the stomach. These conditions subsided under cupping and gastric lavage. Later the lacerations were repaired, the patient ultimately making a complete recovery.

Brodhead, in the same journal, reports a spontaneous rupture of the uterus during labor in a multipara with an ample pelvis. While labor seemed to be progressing normally, but with more than usual pain, the patient had a severe pain in the left side of the abdomen, followed by immediate cessation of uterine contractions, with hemorrhage and vomiting. The abdomen became very tender and the pains severe and continuous.

Upon admission to hospital, the child was immediately delivered by craniotomy. When the head was brought into the pelvis a small rim of cervix could be felt, but this seemed to dilate easily. In reality, the uterus was tearing downward through the cervix.

Upon introducing the hand to remove the placenta, rupture of the uterus was discovered, and, on section, there was a complete tear on the left side, which was not ragged, and which was repaired with two layers of chromic gut sutures. The patient had not lost much blood during her labor. The abdominal incision was closed, and for thirteen days after operation, although the incision healed perfectly, the patient's temperature ranged from 100° F. to 103.6° F. The leukocytosis increased to 10,000. On the right side, between the anterior superior spine and the ribs, a hard mass could be felt about the size of an orange.

An incision was made directly over this mass and the omentum separated, when nearly a pint of foul green pus with dark clots, was evacuated. The cavity was drained, the patient making a good recovery. A small sinus persists from the last operation.

The Danger of Rupture of the Uterus after Cervical Section. Olow¹ reports a number of cases in his own observation, in which women who had had cervical section had afterward borne children. With these, and from the literature, he has collected 30 cases in which, after vaginal Cesarean section, the patients have borne children.

In no case have there been symptoms or apparent danger of rupture of the uterus. From this he concludes that this operation does not predispose to uterine rupture in subsequent labor.

Eclampsia. An interesting case in which eclampsia and melanosarcoma of the ovary and carcinoma of the liver developed during pregnancy, with metastases in the placenta, is reported by Markus.²

Melanosarcoma of the ovary has been reported in 4 out of 36 cases.

The patient under consideration was a multipara, admitted in a condition of cyanosis, with difficult respiration and petechial spots over the lower extremities. There was enlargement of the liver, and the

¹ Zentralblatt für Gynäkologie, 1910, No. 31.

² Archiv für Gynäkologie, 1910, Band xcii, Heft 3.

patient was pregnant at term, and, in addition, was having eclamptic convulsions. The urine was dark yellow, containing very little blood and no bile pigment. The patient was delivered by vaginal Cesarean section, the child being extracted by forceps. The patient's death followed shortly after. Upon autopsy, melanosarcoma of the ovary, with carcinoma of the liver and metastases in the placenta, were present.

THE HEMOTOXIC NATURE OF ECLAMPSIA. Murray¹ reports 3 cases dying of eclampsia, showing marked signs of a toxin attacking the blood, producing changes in the parenchyma of the liver and spleen and retroperitoneal glands.

He explains the fact that in these cases microscopic examination reveals lesions apparently slight in proportion to the severity of the disease, because the toxins present have led to the prevention of or immediate splitting up of all corpuscular thrombi, thereby preventing necrosis.

Experiments show that a period of one or two days is necessary to produce a maximum lesion after injecting the serum into the liver. This apparently explains postpartum eclampsia.

To study the natural hemolytic power of fetal serum of animal corpuscles, the presence or absence of isoagglutinin in normal fetal serum, and the presence or absence of hemolysin in the fetal serum of diseased pregnancies, a length of umbilical cord was tied, cut off at delivery, wrapped in cotton, and placed in an incubator, and used within twelve hours. Part of the contained blood was centrifugalized in Wright's tubes, after clotting, and only tubes were used where clear serum was obtained. Washed red cells were prepared by dropping blood directly into citrated saline solution and standardizing as a 5 per cent. suspension. Equal parts of serum and suspension were mixed in small dry sterile tubes with a diameter of 1 c.cm., incubated for two hours at 37° C., and then placed in an ice chest.

The natural hemolytic power for animals was investigated for rabbits and guinea-pigs. Different human sera act at varying rates on the same rabbits' corpuscles. In various intoxications these differences are still more marked, diabetes having a high coefficient; uremia a low one. The fetal serum showed the same variation. The rate of hemolysis was much slower, the time taken apparently having no relation to the times for maternal sera. Apparently fetal sera are much slower in their action than maternal, and the hemolytic power of maternal sera was compared with that of the male and non-pregnant female, and no deviation from the normal was found. The results for agglutination and hemolysis were invariably negative, and it would appear that fetal serum is wanting in isoagglutinins, as it does not develop isohemolysins in diseased pregnancy, and cannot cause the hemotoxic lesions found in pregnancy.

¹ Journal of Obstetrics and Gynecology of the British Empire, October, 1910.

In studying the hemolysins, the eclamptic placenta showed more lipid per given weight, but these lipoids were markedly more hemolytic. These lipoids were not found to differ from the ordinary lipoids of degenerating tissues. In eclamptic placenta, lipoids are present in larger quantity, and hemolytically more active than in normal pregnancy.

By *anaphylaxis* is understood the serious and frequently fatal attack, mainly convulsive, following the second inoculation under specific conditions of time and quantity of certain complex albuminous substances, not in themselves poisonous when administered in the same quantity as a solitary dose. In guinea-pigs, the phenomenon can be produced by inoculation with horse serum, egg white, milk, and sterilized bacterial products. The less complex proteal substances are not so effective, while broken-down products, as leucin and tryosin, are ineffective.

Such experiments regarding eclampsia are negative in result, and in the present state of our knowledge eclampsia cannot be considered anaphylactic.

Thies¹ has experimented upon animals to determine whether albuminoid bodies from the fetus can act as irritants in producing eclampsia in the mother. He finds evidence that eclampsia can be considered as anaphylactic, produced by albuminoid bodies from the fetus introduced into the mother's organism. The prevalence of eclampsia in primiparae is explained by the anatomical conditions of firmness and activity of the tissue present; and the fact that eclampsia develops during labor, seems to point to a direct passage of albuminoid materials from mother to child. During the puerperal period, the materials introduced from the fetus to the mother during labor may develop and produce eclampsia, and it has been shown by experiment that ox blood can be introduced into the circulation of the guinea-pig, and remain for two or three days before producing characteristic changes.

It seems reasonable to believe that in accounting for eclampsia, we must remember that under normal conditions the placenta forms albuminoid substances of a more molecular formation than those of the organism to which they pass. The placenta plays the same part which is performed in digestion by the epithelia of the intestinal tract. Placental assimilation resembles intestinal. If these substances are passed back into the circulation of the parent, intoxication phenomena follow, and such are produced by the passage of undigested albuminoid substances from fetus to mother.

Fetal eclampsia is a passive anaphylaxis, produced by the passage of albuminoid bodies of maternal origin to the fetus. This he finds confirmed by experiments upon animals, pregnant and non-pregnant, by injecting fetal serum into the circulation. In the case of pregnant animals, pathological phenomena of greater or less severity were caused,

¹ Archiv für Gynäkologie, 1910, Band xcii, Heft 2.

which increased by repeated injections. They finally developed into tonic and clonic spasms, with a fatal result.

In non-pregnant animals, the first injection was usually without result, but those repeated eight days later produced phenomena similar to those observed in pregnant animals.

Eclampsia offers a similar demonstration of the injurious effects produced by albuminoid bodies of fetal origin transmitted to the mother. These substances produce antibodies in the maternal organism, and the union of antibodies with antigen. The albuminoid bodies bring about the manifestations of anaphylaxis and the pathological symptoms which constitute eclampsia.

THE FATTY ACIDS AS A CAUSE OF ECLAMPSIA. Polano¹ has studied the amount of fatty acids in the normal and eclamptic placenta, in blood and in the urine, and finds that fatty acids are present in the chorionic villi of the placenta, in the membranes, and in the umbilical cord.

It could not be shown by examining these materials, and also the blood of eclampsia, that fatty acids are increased in this condition, and that they can be said to cause eclampsia.

THE MAMMARY THEORY OF THE FORMATION OF ECLAMPTIC POISON. Sellheim² advances a new theory in the causation of eclampsia. Some three years ago he had occasion to perform vaginal Cesarean section upon a vigorous primipara, admitted to the hospital seven months pregnant, and suffering from violent eclampsia.

The dead fetus was quickly and easily delivered. The patient's condition grew worse, and a solution of iodide of potassium was injected deeply into the mammary glands. Improvement followed with gradual recovery.

This suggested a possible connection between poisons formed in the mammary gland during pregnancy and eclampsia; and when another primipara at full term, and having violent convulsions, came under observation, both mammary glands were removed as quickly as possible by an incision, turning back the glands, removing the gland substance, and preserving the nipples, skin, and fascia. But one convulsion occurred after the operation, the patient making a speedy recovery.

This suggests the question as to whether toxins formed in the mammary glands may not be one, and possibly the important factor, in the production of eclampsia.

Schenk³ has made investigations to determine THE PART PLAYED BY THE PLACENTA IN CAUSING ECLAMPSIA. By making various experiments with sera from human and other animals, he found it possible to demonstrate toxins in the placenta, and to neutralize these toxins by sera.

¹ Zeitschrift für Geburtshülfe und Gynäkologie, 1909, Band lxxv, Heft 3.

² Zentralblatt für Gynäkologie, 1910, No. 50.

³ Zeitschrift für Geburtshülfe und Gynäkologie, 1910, Band lxxvi, Heft 1.

This sera seemed especially potent in neutralizing the fibrin ferment produced in the placenta. Some of them are efficient in dosage of 0.1 c.cm. to the fatal dose of placental substances; while others in dosage of 1.1 c.c. seem to have no effect. The duration of their activity was from fifteen to thirty minutes, and it seemed to make no difference whether the mixture was kept at a temperature of 70° C. or at the usual temperature of a room. Exposure for half an hour to high temperature did not seem to materially lessen the activity of these sera.

There seems to be no doubt about their action in neutralizing fibrin ferment in the mother's circulation.

A paper interesting to those who study pathological chemistry, on the "Physiological Chemistry of Blood Serum in Eclampsia and Albuminuria and its Prognostic Value," from work done in the University of Parma, is contributed by Ballerini.¹

An interesting and elaborate paper upon the etiological importance of white blood cells in producing the kidney of pregnancy and eclampsia, is contributed by Dienst.²

He finds that in eclampsia and in the kidney of pregnancy there occurs an extreme congestion in the afferent vessels of the uterus and lower portion of the body at the end of pregnancy and the beginning of labor, and that from this retention polynuclear leukocytes abound in the venous channels of the abdomen and inferior extremities. He believes that the fibrin ferment of eclampsia has much to do with the enormous production of these cells, and he has seen good results in eclampsia by the injection of 0.2 gram of hirudin in 50 c.c. of sterile salt solution injected into a vein.

STROGANOFF'S PROPHYLACTIC TREATMENT OF ECLAMPSIA. Stroganoff³ publishes an account of 4 cases of eclampsia treated in the clinics at Vienna under his direction, by so-called prophylactic methods.

This consists in placing the patient at absolute rest, in a quiet, separate room. Narcotics in the shape of morphine hypodermically, chloral hydrate given by rectum, and milk, are employed. A very mild narcosis, with chloroform, is used when the patient becomes restless and has a tendency to convulsions. As much milk as possible is given in small quantities by the mouth and by the rectum. The patient is kept comfortably warm, the room is well ventilated, and all unnecessary disturbance is avoided.

If labor begins, and dilatation is practically complete, the child is delivered.

Stroganoff believes from his experience in 400 cases in St. Petersburg, that from 95 to 98 per cent. of cases of eclampsia can be successfully

¹ *Annali di Ostetricia*, April, 1910.

² *Archiv für Gynäkologie*, 1910, Band xc, Heft 3.

³ *Zentralblatt für Gynäkologie*, 1910, No. 23.

treated by therapeutic means in the manner described, without forcibly emptying the uterus, or without performing decapsulation of the kidneys.

Roth¹ reports 31 cases treated by this method. Chloral hydrate was given suspended in mucilage of acacia. In 31 cases reported by him, 1 died and 30 recovered; 10 cases were terminated by delivery, 7 by forceps, 2 by craniotomy, and 1 by the induction of labor; of the 31, 23 children survived the mother's illness.

THE CLINICAL HISTORY AND TREATMENT OF ECLAMPSIA. Ballantyne² reports 38 cases of eclampsia, with 5 maternal deaths, in an experience covering eighteen months. He has fixed upon the following line of treatment, which gives him increasingly better results:

Whether the eclampsia develops in pregnancy, during labor, or in the puerperium, he orders venesection, transfusion with saline into the vein, the washing out of the stomach with bicarbonate of soda solution, the introduction into the stomach of a large dose of magnesium sulphate, the use of a copious enema of soap and water and castor oil, and the hot pack. He puts obstetric interference more and more into a secondary position, and from the results of his cases we see that he would not interfere until labor was well advanced, when he might assist the birth of the presenting part if it were low down, by forceps or extraction.

Walther³ reviews extensively the recent literature upon the subject.

As regards the old question of immediate delivery *vs.* medicinal treatment, he quotes Winter's statistics of 8 cases, treated by expectant methods, with a maternal mortality of 40 per cent.; 19 cases in which interference was not practised until the os was fully dilated, with a maternal mortality of 30 per cent.; 32 cases where the uterus was emptied, by incision, and dilatation with bags or combined version, with a maternal mortality of 25 per cent.; cases treated by dilatation with Bossi's dilator, with a mortality of 36 per cent.; 34 cases treated by vaginal Cesarean section, with a maternal mortality of 9 per cent.; and 32 cases treated by vaginal Cesarean section, so soon as the first pronounced symptoms of eclampsia developed, with no maternal mortality.

This presents the operative side of the treatment in its most favorable aspect. The use of Bossi's dilator in eclampsia is estimated by Bossi himself to have a maternal mortality, in 395 cases, of 9.45 per cent.

The majority of opinion is not in favor of decapsulation of the kidneys, as its results do not compare favorably with those of other operations. If it is to be done, it should be bilateral, and its mortality is variously reckoned at 1.4 per cent. to 17 fatal cases in 38 cases of eclampsia. In

¹ Archiv für Gynäkologie, 1910, Band xci, Heft 2.

² Journal of Obstetrics and Gynecology of the British Empire, December, 1910.

³ Zeitschrift für Geburtshilfe und Gynäkologie, 1910, Band lxxi, Heft 1.

81 per cent. of patients, well-marked diuresis followed the operation. In 18 per cent. there was no improvement.

As regards medicinal treatment, the tendency is to avoid the free use of chloroform, substituting ether and oxygen. Veratrum is recognized as of value; but little result has followed lumbar puncture and lumbar narcosis.

The experiment of injecting a 25 per cent. solution of magnesium sulphate into the subarachnoid space was without result, and the effort to use parathyroid extract seemed to produce no improvement.

Dienst has urged the use of hirudin. The eliminative treatment of eclampsia by intravenous transfusion, lavage of the gastro-intestinal tract, and sweating, has given good results. In prophylaxis, it is believed that the excretion of the patient should be watched as closely as the circumstances of the case will permit.

Hirst¹ lays stress upon the blood pressure as indicating dangerous toxemia. It should be kept below 180 in the last half of pregnancy, and if it is above 150 it indicates danger. In the presence of convulsions, the colon and stomach are irrigated. Two ounces of castor oil, with a drop or two of croton oil, is placed in the stomach. So soon as the patient can swallow she is given 2-dram doses of a concentrated solution of Epsom salts. Free sweating is induced by a cabinet, for thirty minutes, every four hours. After the first sweat, a quart of salt solution is injected beneath the breasts, and subsequently one quart is injected between each sweat, into the colon. If the blood pressure is over 180, 16 ounces of blood is withdrawn. In medication, 15 minims of fluidextract of veratrum viride is given hypodermically, and subsequently $\frac{1}{100}$ grain of nitroglycerine, every four hours. Chloral and chloroform are thought unimportant. Parathyroid extract, 1 grain every four hours, is considered valuable.

Beyond puncturing the membranes, no interference with labor is practised. This treatment, it is said, should reduce the mortality of eclampsia to less than 10 per cent.

Baisch² estimates that 50 cases of decapsulation of the kidney for eclampsia have been reported, and but 33 recovered. He adds the case of a primipara who had had eleven convulsions, becoming unconscious after the first. Blood had been taken from the patient, and morphine and parathyroidin had been injected, but without appreciable result. The quantity of urine secreted steadily diminished. The urine was dark and hemorrhagic in character. It was albuminous and contained abundant epithelia and casts.

The patient became cyanotic, the blood pressure 150, and the pulse from 120 to 130; nineteen hours after the beginning of labor decapsulation was performed. But a few drops of chloroform and ether mixture

¹ American Journal of Obstetrics, September, 1910.

² Zentralblatt für Gynäkologie, 1910, No. 23.

were necessary for anesthesia. The fat and connective tissue around the kidneys were edematous, and, upon tearing through it, fluid escaped. The kidney itself was not enlarged, and not specially tense, but seemed to be thick and firmer than normal. The convexity of the capsule was incised, and with the finger the capsule was loosened over the kidney substance. There was no hemorrhage, and the wounds were immediately closed without drainage. In a few hours after operation, decided improvement developed. The patient became partly conscious, and an hour after operation could swallow tea and milk. By evening 400 c.c. of comparatively clear urine had been secreted. The highest temperature after operation was 39.2° C. The patient made an uninterrupted recovery.

Schneider¹ reports 34 cases of eclampsia in 5717 labors, or 1 in 168. There were 28 primiparæ, and 6 multiparæ.

It was found that the liability to convulsions increased with the age of the patient, and was especially pronounced in twin pregnancy, occurring in 9 per cent. In no patient was there a history of previous eclampsia. The repetition of eclampsia seems to be rare in the same patient. Scarlatina was the disease which had most often occurred previously, but measles, enteritis, and, in 2 cases, tuberculosis, had also preceded. The greatest number of cases occurred during the month of January, the least during the months of May and July. The majority were at term.

The number of convulsions varied from 1 to 36, and in 3 cases they were so numerous that they were not counted. In 67 per cent., convulsions began before labor; in 8.8 per cent., during labor; and in 23.5 per cent., after labor. The longest convulsion observed was between five and ten minutes.

So far as the symptoms are concerned, if the symptoms are threatening, operation is performed as soon as possible, usually with dilatation of the cervix by elastic bags or bougies, and internal version. Medicinal treatment was reserved largely for puerperal cases, and morphine and chloroform and chloral were used. Venesection and hot packs, with limited diet, and salines, were also employed. In puerperal cases, a patient was placed in a separate and isolated room and kept as quiet as possible.

The mortality rate was 2.9 per cent., or 1 in 34; there were 37 children born, with 13 deaths, or 35 per cent., and making allowance for the children prematurely born, the fetal mortality was 33 $\frac{1}{3}$ per cent. In one case, a child had convulsions eight hours after its birth.

Gobiet² reports 2 cases of decapsulation of the kidneys for eclampsia. The first was done after the patient had been delivered by vaginal Cesarean section; ten hours after delivery double decapsulation was

¹ Archiv für Gynäkologie, 1910, Band xc, Heft 3.

² Zentralblatt für Gynäkologie, 1910, No. 36.

performed, the right kidney being found small, with areas of grayish tissue in its superficial portion, and with many small hemorrhagic points. The kidney was split and a drain was placed in the pelvis. The kidney substance seemed to be in spots necrotic. The left kidney was considerably enlarged, yellowish gray, with many hemorrhagic spots. The capsule was not tense, but the kidney was incised and drained also.

The patient did not rally from the operation, and had eight eclamptic convulsions after it was done. Death occurred twenty-six hours after decapsulation, from edema of the lungs, and very little, if any effect, was observed upon the secretion of urine.

The microscopic examination of the kidneys showed acute hemorrhagic nephritis.

The second case was also delivered with vaginal Cesarean section, the child being dead and the placenta very large. Convulsions occurred soon after delivery, the patient having in all over fifty before decapsulation was performed. Fifteen hours after delivery double decapsulation was done, under light ether narcosis. The right kidney was not specially enlarged, was dark bluish red, and with apparently no special tension of the capsule. The left kidney was enlarged, but in structure resembled the right. Both were drained. The convulsions ceased after decapsulation, the secretion of urine increased, and the patient became conscious and made a good recovery.

Lichtenstein¹ reports 4 cases of decapsulation of the kidney for eclampsia.

The first patient had in all 25 convulsions, 6 before labor, 19 afterward, and none after decapsulation. The cervix was dilated by gauze, the child delivered by forceps, and twelve hours afterward double decapsulation was performed. There was marked increase in the secretion of urine. Eight days after labor the patient's mind seemed normally clear, and on the fifteenth day after operation she was discharged recovered.

The third case had 12 per cent. of albumin, and 33 convulsions—3 before labor, 29 after labor in fourteen hours, and 1 after the operation.

She was brought to the hospital after delivery. Fourteen hours afterward decapsulation was performed, followed by marked diuresis. On the second day the patient became normally conscious.

The fourth patient had premature labor induced for severe nephritis, with artificial dilatation by gauze, and delivery of the child by forceps. Eclampsia developed fifteen days after labor, with 21 convulsions in fourteen hours. The secretion of urine was greatly diminished. Fourteen hours after the first convulsion, decapsulation was done without improvement, the patient dying twenty hours later.

Autopsy showed complete fatty degeneration of both kidneys.

¹ Zentralblatt für Gynäkologie, 1910, No. 2.

In performing these operations, the incision was made along the twelfth rib. The fatty capsule of the kidneys was sutured, and drainage with a rubber drainage tube was employed on both, or on one side. The kidneys were dark blue in color, and there was some retraction of the capsule when the kidney was incised.

VAGINAL CESAREAN SECTION FOR ECLAMPSIA. Goldberg¹ reports 3 cases of eclampsia treated by vaginal Cesarean section. In these patients eclamptic convulsions ceased after delivery.

In the first case, the child was delivered by forceps after operation had been performed, while the head was in the grasp of the forceps. There was no special bleeding. Convulsions ceased after the delivery. After recovery from this pregnancy, another supervened, ending in premature labor at the seventh month.

In the second case, in closing the wound, the inferior portion of the cervix was amputated. It had been previously torn, and much scar tissue had developed. The child was premature and could not be revived. The puerperal period was complicated by the retention of a clot in the cervix.

Although the patient was warned of the dangers of pregnancy, she again conceived, and was again brought to the hospital in eclamptic convulsions. The child's heart sounds could not be heard. She recovered after the uterus was emptied.

The third patient recovered from delivery, but developed a left-sided pneumonia. She was transferred to her home, and afterward died from an extension of the pneumonia to the right lung.

THE TREATMENT OF ECLAMPSIA BY THE CONTINUOUS INSTILLATION OF SUGAR WATER. Jacobson² reports 2 cases of eclampsia treated by the continuous instillation of sugar water—one teaspoonful of granulated sugar to one quart of water, at a temperature of 115° F. This was given through a fountain syringe into the rectum. Tincture of veratrum viride, in 10-drop doses, was given hypodermically every four hours, or oftener, until the pulse was below 80. The patient was caused to sweat in hot blankets, was given codeine if restless, and nothing by mouth but seltzer or plain water. Salt was withheld in every form. The specific gravity of the blood was 1058.

On the third day, by mistake, the patient was given an ounce of magnesium sulphate; twelve hours later she became restless and irrational, and tried to get out of bed.

The second case was evidently nephritic, and had labor induced with the hope of avoiding eclampsia. At the end of the first stage convulsions developed, and the patient was delivered, with forceps and version, of twin children. The convulsions continuing, 6 ounces of blood were taken from the vein. The patient received 70 minims of veratrum

¹ Zentralblatt für Gynäkologie, 1910, No. 52.

² American Journal of Obstetrics, June, 1910.

viride in seven hours without effect, which led to the conclusion that the preparation of the drug was inert. A reliable extract was obtained, when some effect was noticed. The constant rectal instillation of sugar water was started after the second convulsion, the patient having no more. She sweat profusely, and the specific gravity of the blood became 1060. Eight days after labor it was 1052. Diuresis was abundant, and the patient was discharged with the child in good condition.

The use of sugar water is based upon the belief that eclampsia is caused by the retention in the blood of salts, principally sodium chloride, which the damaged kidneys are unable to throw off. These retained salines raise the molecular concentration of the blood, and increase its specific gravity. If the molecular concentration of the blood is reduced to normal, the patient will at least temporarily recover. To do this, the author has withheld food from eclamptics for three days, permitting nothing to be taken by the mouth but water. Salt solution was discarded, as it was believed that too much salt was already in the patient's blood. Sugar was selected because of its high molecular weight, which would reduce the molecular concentration of the blood when mixed with it. Under this treatment the specific gravity of the blood fell from 1060 to 1052.

Staude¹ has studied the results of various methods of treatment in eclampsia in 300 cases in the Hamburg clinic. The maternal mortality was 21 per cent. Of these, 252 cases occurred during labor, 35 in the puerperal period, and 13 in pregnancy. He has studied these cases especially from the standpoint of treatment by rapid delivery.

His cases are divided into one group of 128, before the introduction of vaginal Cesarean section; and a second group of 124 after this operation had become popular. Bossi's dilator gave a fatal result in 3 out of 4 cases. In 39 cases of vaginal Cesarean section, 9 perished. None of these deaths was ascribed to the operation, but all to the eclampsia. With the exception of surgical accidents, no patient dies of the operation, but all die of the disease or accident for which the operation was undertaken.

Abdominal Cesarean section was performed six times, on two dying patients, with a fatal result; on four in fairly good condition, with three recoveries and one death from sepsis after operation had been performed outside the hospital, in unfavorable surroundings.

Among the 128 cases, 51 had spontaneous labor, and 77 some artificial method of vaginal delivery. The mortality of operations before the adoption of vaginal Cesarean section was 43 per cent., and after the adoption of this section 20.6 per cent.

It is thought that the results in different years depend not only upon the variety of treatment, but quite as much or even more upon the type of the disease. It is observed that in some years the cases

¹ *Monatsschrift für Geburtshülfe und Gynäkologie*, 1910, Band xxxi, Heft 3.

are specially severe, and that no method of treatment gives good results.

Among the 83 cases terminating spontaneously, the mortality was 10.8 per cent.; the 13 cases in pregnancy had no mortality. When the forceps was applied to the head in the pelvis, in a favorable position, in 40 cases there were 5 maternal deaths. When the bags were used in dilatation, or the cervix was incised, and the child was delivered by forceps, the maternal mortality was 31 per cent.; when version was performed, 47 per cent.; while embryotomy and vaginal Cesarean section had each a mortality of 23 per cent.

These statistics are not entirely favorable to the treatment of eclampsia by operation, as a mortality of 10.8 per cent. in cases proceeding without interference, is far better than that of any variety of operation.

In estimating the severity or mildness of a given case, Staude relies upon cryoscopy. In a case in which the freezing point of the urine is not lower than 0.6 to 0.61, the prognosis is considered favorable; while cases in which the freezing point is lower than that are thought more grave, and are subjected to rapid delivery.

There were but three exceptions to this rule in these cases—one fatal case with a freezing point of 0.59, and two with 0.65, and 0.69.

Staude believes from his observations that there are many cases of eclampsia in which there is no necessity for rapid delivery, and in which the family physician may treat the patient without interference until symptoms of threatened danger appear. Eclamptic patients should be in clinic, where operation can be promptly undertaken if necessary.

As regards puerperal eclampsia, the number of convulsions was much less than in the other varieties; and in but one case coming to autopsy, were conditions discovered which might have indicated decapsulation of the kidneys.

In discussion, Poten reported 258 cases of eclampsia, with a mortality of 18.9 per cent. The general treatment consisted in the use of narcotics, and with no interference until labor had spontaneously proceeded for some time.

Albeck¹ contributes a paper upon the clinical history and treatment of eclampsia in the Copenhagen Maternity. His cases numbered 161 mothers and 166 children, with a maternal mortality of 19.9 per cent., and a fetal mortality of 37.3 per cent.

He recognized the fact that convulsions may occasionally occur without previous symptoms, and form practically the first symptom of eclampsia. In the majority of cases, convulsions are an additional symptom of the illness, which has already caused some cerebral disturbance. His general observation of the symptoms agrees with that of others, and he found 10 cases of mental disturbance, more or less

¹ Zeitschrift für Geburtshilfe und Gynäkologie, 1910, Band lxxvii, Heft 1.

acute, following eclampsia. There were 8 cases of postpartum eclampsia; 12 cases of eclampsia without convulsions are reported, with one maternal death from chronic nephritis, and with extensive albuminuric retinitis.

Autopsy showed pronounced changes in the liver and kidneys.

In *treatment*, the prophylaxis employed is essentially milk diet.

As regards the *result of operation*, it is interesting to observe that the mortality, where patients were delivered without previous dilatation of the birth canal, was 23.8 per cent. A further analyses of the cases shows that the mortality for mothers and children is much increased the longer the eclampsia lasts. In cases in which the birth canal was dilated at the time of delivery, the maternal mortality was greatly reduced.

Johnston¹ draws attention to postpartum or puerperal eclampsia. He does not attempt to make suggestions concerning the treatment of this condition, but believes the fact that 17 per cent. of eclampsias originate after labor furnishes a valid argument against immediately emptying the uterus in eclampsia, which begins before or during labor.

Our knowledge of the causes of postpartum eclampsia, he thinks, is even less satisfactory than what we know concerning eclampsia developing earlier in parturition. In the Royal Maternity Hospital of Edinburgh, in 5800 parturient patients, there were 126 cases of eclampsia, or 2.2 per cent. Of these, 16 were postpartum, or 12.6 per cent.

An examination of the literature of the subject gives an average of 17.41 per cent. of postpartum eclampsias.

The *mortality* as reported by other writers varies from 5.2 per cent. to 43 per cent.

SHALL ECLAMPTIC MOTHERS NURSE THEIR NEWBORN? Goodall² reports 3 cases of eclampsia where the children died afterward with cyanosis, distention of the abdomen, and coma. He believes from these cases, and from the review of the literature, that in a mother profoundly toxemic and jaundiced, the child should be artificially fed, and the mother's breasts pumped until the maternal toxemia is relieved, before the child is allowed to nurse.

If the mother's convulsions are postpartum, the child should not nurse until the mother is better, and then as much milk as possible should be removed from the breasts before the child nurses. If albuminuria persists after delivery, the child should not nurse.

The reviewer has for some time made it the rule not to allow the children of mothers having eclampsia to nurse until the mother's condition has been normal for several weeks. A similar precaution is taken in all women who are highly toxemic during pregnancy, for

¹ Journal of Obstetrics and Gynecology of the British Empire, January, 1910.

² American Journal of Obstetrics, January, 1911.

I have in numerous instances seen the child die of toxemia within a short time after birth. Caution should be observed in allowing the children of mothers who have had pernicious nausea, and have recovered and gone on with pregnancy, to nurse, for in these cases the milk not infrequently disagrees with the child, and may bring about a serious or fatal issue. There is no practical and simple method of estimating the toxicity of breast-milk, and the physician must be governed in these cases by his clinical observation, and by the general history of the mother during pregnancy.

THE WASSERMANN REACTION IN ECLAMPSIA. Semon¹ has examined 20 cases of eclampsia—13 severe and 7 mild—to determine their response to the Wassermann reaction.

In 3, he obtained a positive result; in one, a doubtful result. The 3 positive reactions occurred in cases which showed nothing peculiar so far as the eclampsia was concerned.

The Toxicity of the Placenta. Guggisberg² has made experiments to determine the toxicity of the placenta. He finds that extracts from the placenta of the human and other species, injected intravenously into animals, produce the phenomena of coagulation and embolism, usually causing a fatal issue.

In these cases it was interesting to observe that the extracts were made from tissues containing the cells of the placenta. When placental tissue without its cells was taken, the results were quite different.

The conclusion is reached that the cellular toxins of the placenta are not present in each case, and that there are placenta in which these toxins are wanting. The result of the injection of placental toxins is complex. There is evidence that one of the bodies produces coagulation of the blood, while other substances have quite a different effect. We do not yet know precisely the nature of placental toxins. They seem to be ferments. Dilution of these substances makes them much less potent, or causes their action to cease. A temperature of 50° C. is necessary for their production, and we have not yet learned what effect other temperatures would have. Neither in normal placenta, nor in the placenta of pregnant patients, can be isolated immunizing substances for these ferments. Extracts from various organs, such as the muscles, heart muscle and spleen, which contain no epithelial cells, are often inert when injected into animals. Extracts from organs containing cells, as the kidneys and liver, produce other results, but they are not identical with those produced by placental cells.

Premature Detachment of Normally Situated Placenta. Goldstine³ reviews the literature of the subject, with special reference to the treatment of this condition by the vaginal tampon and abdominal binder. He has collected the results of 69 cases, in 15 of which hemor-

¹ Zeitschrift für Geburtshilfe und Gynäkologie, 1910, Band lxxvii, Heft 3.

² Ibid., Heft 1.

³ Surgery, Gynecology and Obstetrics, February, 1910.

rhage was controlled and pains came on in four hours or less; in 17, from four to seven hours; in 24, from seven to twelve hours; in 10, from twelve to twenty-four hours; and over twenty-four hours in 3; in 69 cases, hemorrhage was controlled in 66.

There were 7 deaths, 2 from rupture of the uterus, 1 died on the fourth day, and 1 died of sepsis on the twelfth day.

He concludes that rupture of the membranes and leaving delivery to nature is only justifiable when the uterus is contracting vigorously, and the os is fully dilated. Rupture of the membranes and rapid delivery should not be done until the uterus is contracting rhythmically, the patient has rallied, and the os has undergone some degree of dilatation. When there are no uterine contractions, and no dilatation, and the patient is in a condition of prostration and shock, the tampon and binder should be used. If the uterine walls are incapable of withstanding the pressure of the maternal blood, external hemorrhage may be converted into a concealed hemorrhage by the use of the tampon. If properly applied, the tampon and binder will assist the uterine walls in resisting the pressure of gradual distention.

Placenta Prævia. New interest has been excited in this important topic by the use of dilating bags within the fetal sac and by clinical experience with Momburg's method of controlling pelvic hemorrhage by the pad and bandage.

Sigwart¹ reports 2 cases of placenta prævia treated by vaginal Cesarean section, hemorrhage being controlled by Momburg's method. The Momburg bandage and pad were applied before the operation was performed, and the extraction of the child was accomplished with very little hemorrhage. In both cases, the uterus contracted promptly after the child was born and remained contracted. The placenta was quickly expelled, the uterus remaining firm and hard. The wounds in the cervix and vagina were practically free from hemorrhage, although the cervical incision passed through a portion of the placental attachment. The tissues were so free from blood that the stitching of the cervix and vagina could be demonstrated without difficulty. After the removal of the bandage, the uterus remained firm, and the bleeding did not return. One of the patients was in an especially collapsed condition, and had suffered several severe hemorrhages before the operation. During delivery severe bleeding occurred, which brought the patient into extreme collapse. Both lower extremities were bandaged with the Esmarch bandage, as well as the trunk of the body with the Momburg bandage. The results were good.

Sigwart believes that by using the Momburg bandage vaginal Cesarean section can be performed for placenta prævia with practically no loss of blood. In these 2 cases, 1 of the children survived; the other did not. In 121 cases of placenta prævia under Sigwart's

¹ Zentralblatt für Gynäkologie, 1910 No. 28.

observation, one patient died after version from collapse, giving a maternal mortality of 0.45 per cent.; the fetal mortality in children at full term was 40.2 per cent.

So far as the treatment was concerned, where it was possible the membranes were ruptured and the tampon was employed. In 30 cases, rupture of the membranes alone was sufficient, with stimulation of uterine contractions. In 18 cases, hemorrhage was partly controlled by the tampon until the membranes could be ruptured, and pressure by the head could limit the bleeding. The fetal mortality in these 48 cases was 23 per cent. The Braxton-Hicks method of combined version was employed in 71 patients, and among these was the death already reported. The mortality of the viable children was 60.4 per cent. There were 24 cases of central placenta prævia with viable children, with a fetal mortality of 79 per cent.; in 33 cases of central placenta prævia treated by the use of the bag introduced within the sac of the ovum, there was no maternal death.

As regards the selection of cases of placenta prævia for vaginal section, this operation is only possible in a successful way in hospitals and in the hands of specialists.

Weischer¹ gives the results of treatment of placenta prævia in Olshausen's clinic in Berlin, by the so-called "old-method" of combined version, and the more modern method with the use of the dilating bag. The number of cases was 346. In the cases admitted to the hospital, the placenta was central in 40.6 per cent., and in polyclinic cases in 33.5 per cent. In the hospital cases, the placenta was lateral in 55.3 per cent.; in polyclinic cases, in 66.4 per cent.

After analyzing the cases in detail, he comes to the conclusion that by combined version of the Braxton-Hicks method, the maternal mortality was 7.4 per cent.; the fetal mortality was 74.1 per cent.

When other reports are compared, we find:

	Per cent.
Nordmann—maternal mortality	2.0
Ahlfeld—maternal mortality	2.6
Cherite	3.7
Obermann	4.0
Maiss	5.0
Hammerschlag	6.3
Chrobak	9.0
Charité Polyclinic	9.09
Geuer	10.0
Charité Clinic	14.0
Weber	20.0
Sigwart	1.4

A remarkably good result.

¹ Zeitschrift für Geburtshilfe und Gynäkologie, 1910, Band lxxvii, Heft 2.

By combined version, the fetal mortality was estimated by—

	Per cent.
Chrobak	52.4
Ahlfeld	52.6
Cherite	57.8
Obermann	62.5
Weber	63.8
Maiss	65.0
Geuer	66.6
Nordmann	77.5
Hammerschlag	84.0
Charité	92.6
Sigwart	60.4

By the use of bags, Weischer had a maternal mortality of 8.5 per cent.

Among the cases admitted to hospital, the mortality was 21.5 per cent., while in polyclinic cases the mortality was *nil*. The fetal mortality attending the use of bags was 46.8 per cent. Hammerschlag, Hannes, and Bürger-Graf, had a maternal mortality of 5.8 per cent. with the use of bags. Zimmermann, 6 per cent.; Holst, 12.5 per cent. Sigwart lost no mother in 33 cases. The fetal mortality with the use of bags is stated by Thies at 14 per cent.; by Dührssen as 16.6 per cent.; Freund, 20 per cent.; Hannes, 30 per cent.; Keetman, 50 per cent.; Zimmermann, 62 per cent.; Holst, 60 to 65 per cent.

The high mortality rate given by the author in his cases admitted to hospital is owing largely to the fact that the patients were brought to the hospital in a condition of severe anemia and shock. But very little further blood loss was sufficient to bring about a fatal termination.

In view of the apparatus required and the somewhat difficult technique necessary for the successful use of dilating bags in these cases, the author believes that the general practitioner will do better by attempting combined version. The use of the bag should be reserved for cases where the child is living and viable, although it must not be forgotten that in all cases the maternal life is to be awarded precedence.

Gussakow¹ tabulates from the Imperial Maternity Hospital at St. Petersburg, 137 cases of placenta prævia. The maternal mortality is given at 5.8 per cent.; the fetal mortality at 64.9 per cent. In central placenta prævia, there were 25 cases with a mortality of 6, or 24 per cent.; in 112 cases of partial placenta prævia, there was a mortality of 2, or 1.7 per cent.

From these cases he concludes regarding treatment, that so long as the membranes remain unruptured no method of treatment should

¹ Monatschrift für Geburtshülfe und Gynäkologie, 1910, Band xxxii, Heft 3.

be employed which excites uterine contractions. The use of the tampon is to be omitted because it is inefficient in preventing hemorrhage, and is very apt to produce infection. In partial placenta prævia, rupture of the membranes and stimulation of uterine contractions is often sufficient to check the hemorrhage. When this is not the case, the elastic bag should be introduced within the cavity of the ovum, and this method seems preferable to combined version. In central placenta prævia, the placenta should be bored through and the placenta should not be separated.

The determination of the best time for operation in placenta prævia should be made when the diagnosis is established. With a patient in a hospital under close observation, this decision may sometimes be delayed. Placenta prævia requires the most vigorous antiseptic precautions.

To prevent embolism, one must take care that negative pressure in the vessels of the abdomen and pelvis does not develop, and that no special pressure is put upon the air which enters the genital tract during delivery. It is important in stating such cases that the distinction between central and partial placenta prævia should be clearly defined. In cases in which the placenta is central, and mother and child are in good condition, the patient should be given the choice of abdominal Cesarean section, if she is anxious to obtain a living child.

Henkel¹ reviews the various methods of treatment in placenta prævia, and gives his own experience in 84 cases occurring in 3882 labors in the Greifswald clinic. The elastic bag was used to make pressure in 30 cases, with a maternal mortality of 6, or 20 per cent., and a fetal mortality of 15, or 50 per cent. Most of the children were under the average in weight.

In the last few years Henkel has treated 26 cases of placenta prævia, with 2 maternal deaths; one which had been repeatedly tamponed from pyemia, and one from hemorrhage.

The resident staff of the hospital employed combined version, while Henkel himself practised vaginal Cesarean section and abdominal Cesarean section. There were 5 of these cases without mortality for mother and child.

Henkel would reserve Cesarean section, vaginal or abdominal, for central placenta prævia, and would choose the abdominal operation when the child was at full term, whether it was living or dead. Where the child was premature, he would employ vaginal Cesarean section, emptying the uterus by embryotomy and cranioclasis, and opening the fetal head as freely as necessary. If indicated, clamps can be applied to both uterine arteries during operation to control the hemorrhage.

¹ Archiv für Gynäkologie, 1910, Band xc, Heft 3.

Hauck¹ writes concerning the experience of the Copenhagen clinic in the treatment of placenta prævia, with special reference to the use of the dilating bag. He found that whether the bag was within or without the ovular sac made very little difference so far as the length of the delivery was concerned. The danger of infection was greater when the bag was placed outside the ovum than when it was introduced through the placenta within the ovum.

If the mother's interests alone are to be first considered, the bag should be placed within the ovum, or certainly within the chorion. No weight should be attached to the bag unless profuse hemorrhage occurs, or the labor is exceedingly prolonged. Delivery must be effected with great care, and, if possible, with a fully dilated cervix. The dilating bag should be large enough to completely open the cervix, thus providing for an easy passage of the fetus.

Attention is called to the fact that intraovular pressure by the dilating bag may interfere with the fetal circulation, and in some cases produce fetal death. For the child, this method then may be a dangerous one, but if its interests are to be considered, the rule must be followed that no method of delivery be adopted until the os is fully dilated. Care should be taken to secure the expulsion of the bag before it has made pressure too long. The child's chances are lessened in primiparous patients, in mothers who are greatly shocked, and in central placenta prævia.

As regards the rupture of the membranes, it is for the mother the most valuable method of treatment in all cases where it is possible. Combined version, often without extraction, is the safest for the mother; although the operation may present great difficulties, and in some cases be accompanied by serious hemorrhage.

An equal objection can be urged against the use of the dilating bag, which is quite as difficult as combined version. One may say, however, that the use of the dilating bag within the ovular sac will give the child the best chance without increasing the mother's risks.

Kupferberg² quotes the latest statistics for placenta prævia as giving a maternal mortality of 20 per cent.; in hospitals it was reduced to between 5 and 6 per cent., with the highest fetal mortality at 60 per cent., and the lowest at 20 per cent.

Attention is drawn to the danger of proceeding to extraction after making version. He reports the case of a multipara who earnestly desired a living child, who was treated by the vaginal tampon, and as this did not control the bleeding she was taken to the hospital and the dilating bag inserted. Six hours later this was expelled, followed by hemorrhage and prolapse of the cord, which beat feebly. Version was then performed with extraction, and a child weighing 9 pounds was

¹ Monatsschrift für Geburtshilfe und Gynäkologie, 1910, Band xxxi, Heft 5.

² Ibid.

born asphyxiated. It could not be revived. Profuse hemorrhage followed, and a deep tear on the right side of the cervix was found extending into the connective tissue about the vagina. Hemorrhage was profuse, and Momburg's bandage was used, without result. The condition of the patient became desperate, and to check the bleeding supravaginal amputation of the uterus was performed. The patient made a good recovery, and lacerations occurring in previous labors were afterward repaired.

He believes that rapid extraction of the child after version, in these cases, is bound to produce serious and often fatal lacerations.

Olow¹ reports 41 cases of placenta prævia, of which 29 were treated by version, with the spontaneous expulsion of the child when it could possibly be secured. This was accomplished in 10 cases, and in 2 it was necessary to use the forceps to the aftercoming head; 21 of these patients had a puerperal period without complications; 2 patients had fever; and one of these patients died. There was no severe laceration of the cervix. There was one case of twins, which brought the number of children up to 30; of 15 cases in which the children were at full term, 6 were born living, 6 died during birth, and 3 perished during version. Of the 10 children who were not at full term, 7 were born living and 3 perished.

There were 12 cases in which birth occurred without interference except rupture of the membranes, or by pulling down the foot in breech presentation, or by delivering the head with forceps. None of these mothers died, and 9 had normal puerperal periods and in 3 the temperature range was remarkably low.

He believes that one objection to the performance of Cesarean section in these cases is the fact that so many of them are brought to hospital after the tampon has been used, and this is almost certain to produce infection.

Histological Changes in Early Abortion. THE VESSELS OF THE DECIDUA. Watson and Wade² studied a case of abortion, apparently at ten days, which was a complete decidual cast of the uterus, on one wall of which the ovum was visible as a small elevation as large as a pea.

The patient had had two full term pregnancies followed by several abortions, varying in time from a few weeks to four and a half months. Hemorrhage had preceded them all for a considerable time, and also happened in the second pregnancy. The symptoms pointed to an abnormal condition in the decidua. Potassium iodide and mercury had been given, but had not prevented abortion.

Upon examining the specimen without the microscope, the small pea-like body was evidently the ovum covered with decidua, and measured 0.8 cm. in diameter. Upon microscopic examination, the chorion

¹ Zentralblatt für Gynäkologie, 1910, No. 13.

² Journal of Obstetrics and Gynecology of the British Empire, February, 1910.

with its villi was everywhere surrounded by decidua, the fetal portion being relatively thin. The placenta and uterine decidua were shaggy on their under aspect as the result of separation from the uterine wall. The complicated and spongy layers could be made out, and separation had taken place through the latter. The decidual reaction was most marked in the immediate neighborhood of the ovum, but even there the decidual cells did not form the dense cellular layers usually found, but were separated from each other by intercellular substance, granular in appearance, and by small round cells. In the uterine decidua and deeper spongy layer of the placental decidua, the cells were slightly enlarged and in places widely separated.

In the vessels of the spongy layer, there was marked thickening of their clots, sometimes obliterating the lumen. This was caused by a deposit of fibrous tissue around the lumen, and also by the proliferation of the endothelial coat.

In the intervals, between two of the patient's pregnancies, curetting was performed, and, upon examining the tissue removed, extravasation of blood was found in the stroma of the endometrium, and the vessels were observed to be greatly thickened.

Such a process could result from syphilis or sclerosis, due to premature senility or local toxic absorption.

In searching for the cause of the abortions, the separation occurred through the spongy layer of the decidua with a clean-cut line of cleavage. In some areas the tissue between the glands consisted of necrotic material whose vessels showed marked pathological change. In other portions actual thrombosis was present, while in some the lumen was narrowed by a proliferation of the endothelial lining with fibrous tissue cells surrounding the walls. Blood was extravasated around these vessels.

In this case, one could make a diagnosis of abortion, caused by disease of the decidua affecting the vessels, and not from changes originating in the ovum.

The Treatment of Abortion. Stowe¹ summarizes 750 cases occurring in the out-patient department of the Chicago Lying-in Hospital.

So far as treatment is concerned, he believes that all cases of uterine hemorrhage accompanied by intermittent pelvic pain in women of child-bearing age, should be treated as acute abortion. In threatened abortion, absolute rest in bed must be insisted upon until all pain and bleeding have ceased. To avoid anemia and prostration, blood loss should be prevented so far as possible, and for tampon material he prefers pledgets of cotton. When the uterus must be emptied he advises curetting by the finger, and the manual removal of the uterine contents whenever it is possible. When the uterine contents can be expelled by abdominal and vaginal compression, he would carry out that method

¹ Surgery, Gynecology, and Obstetrics, January, 1910.

of treatment. He believes that laminaria tents can be sterilized only with the greatest difficulty, and that the effort to dilate the uterus by steel dilators and sounds is attended with danger of perforation. In cases of acute abortion, the steel curette may perforate the uterus, while in cases in which this instrument is used for repeated abortion, the danger is much less. Curetting for abortion should be considered a surgical operation, and should be as carefully and thoroughly performed as any surgical procedure, in the hands of a competent person.

After the uterus is empty, the curette should not be used. Ergot, however, should be given. While infection is limited to the uterine cavity in septic abortion, the uterine contents should be extracted as gently as possible. If the septic process has spread to the peritoneum or adnexa, interference with the uterus should be avoided.

Cadesi¹ gives the results of the treatment of abortion in Mangiagalli's clinic at Milan.

In 76 cases of threatened abortion, 28 actually came to abortion. In 81 cases of inevitable abortion, operation was performed in 20; in 13 cases, operation was undertaken for retention of portions of the embryo and hemorrhage; and 7 times for fever.

These were all cases in which abortion was inevitable and in which interference was practised because it was seen that the abortion could not have been prevented.

There were 484 cases of incomplete abortion; 275 complicated by retention of portions of the embryo and hemorrhage; and 209 by symptoms of infection. Among the cases complicated by retention and hemorrhage, 225 were operated upon, and of the cases complicated by infection 197; making a total of 422 cases operated upon out of 484. In the majority of cases, the operation consisted in curetting. A considerable number were treated by the removal of portions of the ovum by the finger.

Out of the 225 cases in which operative interference was practised, there were 3 deaths; one from embolism, and two from endometritis and salpingitis.

There were 209 cases of incomplete abortion complicated by infection, in which operation was done in 197. Of these 209 patients, 172 recovered; 10 suffered from septic endometritis; 8 from ovaro-salpingitis. There were 7 deaths; 5 from septic infection, and 2 from intercurrent affections. There were 32 cases of abortion caused by retroflexion of the pregnant uterus, and it was necessary to operate on 28 of these; 27 recovered without complications, but one had salpingitis; 9 patients aborted because of fibroid tumors in the uterus, and all of these had operative interference. One suffered from endometritis accompanied by necrosis of the fibroid tumor.

¹ *Annali di Ostetricia*, 1910, No. 3.

The Medicolegal Aspects of Therapeutic Abortion. Thorn¹ discusses at length the medicolegal points in cases of therapeutic abortion. He concludes that no valid criticism of the interruption of pregnancy by a qualified physician can be made, provided the operation be done at the request of the patient for the purpose of avoiding the manifest danger to her health and life.

The physician, however, is bound, in order to put himself in an assured position, to summon a consultation to decide definitely upon the danger present, and whether it can be averted by the proposed abortion.

LABOR.

Incontinence of Urine following Labor. Miller² reviews the literature of this subject, and states that he has seen in the last five years 4 cases of prolonged incontinence which was the result of labor.

In the first case, a multipara, the condition had existed for nine months and had gradually grown worse. There was no incontinence when the patient was lying down, but on coughing, walking, or laughing, she had no control. Her last labor, four years before, was difficult and instrumental. Examination showed an old laceration of the perineum with a gaping vagina and sagging of the anterior vaginal wall. The uterus was low and retroverted.

Cystoscopic examination showed the urethra shorter than normal, with a dilated posterior portion. The mucous membrane of the urethra and bladder was apparently normal.

In the second case, the condition developed after labor, version having been done, and an attempt to deliver the head with forceps, when the instrument slipped and one blade had caused a deep laceration, separating the urethra from the symphysis. The patient was delivered by craniotomy, the laceration extending from the meatus nearly to the neck of the bladder. The patient's condition was such that no attempt could be made to close the lacerations immediately. Two months afterward the parts were found greatly lacerated, the vagina gaping, the uterus retroverted, and the urethra hanging by the side in which laceration had not taken place. The incontinence had been at first complete, but the patient partially regained control of the urine until another pregnancy occurred; five months after delivery, when, as the uterus grew the incontinence became more marked. The urethra hung away from the symphysis downward and toward the right. It was much shortened, the interior of its canal measuring $1\frac{3}{4}$ cm.

In the third case, the trouble developed after the delivery of a breech presentation. There was a deep laceration of the cervix extending to

¹ Zentralblatt für Gynäkologie, 1910, No. 15.

² Surgery, Gynecology, and Obstetrics, January, 1910.

the right and anteriorly along the vaginal vault. The scar was very rigid, and the anterior vaginal wall prolapsed. This condition gradually disappeared, in spite of another pregnancy.

In the fourth case, the condition appeared during the second pregnancy, following within three months of normal delivery, in which no appreciable laceration of the perineum had occurred. Pelvic examination showed a relaxed and slightly gaping vagina, with a slight tendency to cystocele.

In studying these cases, it becomes apparent that there is no single constant cause for the incontinence which appears after labor. It may develop immediately when the urethra is bruised, edematous, or swollen; its posterior portion dilated by the pressure of the fetal parts; and its nerve supply temporarily injured. It may also follow lacerations along the side of the urethra, where the partial cutting off of the nerve supply and the sagging condition would account for it.

The *prophylaxis* consists in proper obstetric treatment during labor, including the careful and immediate repair of extensive lacerations and the prevention of infection. Special care must be taken, in cases in which the pelvis is opened, to avoid too wide separation of the pubic bones. The incontinence which immediately follows labor usually disappears as the parts undergo involution. After a few weeks the retrodisplaced uterus may be replaced, and a well-fitting pessary used which not only supports the uterus, but favors involution of the pelvic tissues by gentle pressure along the anterior part of the pessary against the urethra. The galvanic current is occasionally useful.

Various operations have been proposed, those of Pawlik, Dudley, and Gersuny, being especially valuable.

Miller operated upon one of his cases, combining with the plastic operation over the posterior urethra and neck of the bladder an anterior and posterior colporrhaphy, with suspension of the retroverted uterus. The tightening of the posterior urethra was so marked that the woman had to be catheterized for about two weeks; but after that urination was normal, and three years later there had been no return of the incontinence.

Labor Complicated by Rigidity of the Soft Parts, and its Treatment. Seitz¹ contributes an extensive paper from Döderlein's clinic in Munich, giving the results of his studies in 5000 cases of labor, exclusive of contracted pelvis, to determine the influence of the prolongation of labor, and the resistance of the soft parts upon maternal and fetal mortality.

In 687 cases, the second stage of labor lasted more than two hours in primiparæ and multiparæ. In 54.8 per cent. this was caused by rigidity of the soft parts; in 13.8 per cent. through the large size of the child; in 12.7 per cent. through weak contractions of the uterus; and in 14 per cent. from premature rupture of the membranes.

¹ Archiv für Gynäkologie, 1910, Band xc, Heft 1.

It is noticeable that in three-fourths of these cases rigidity of the soft parts caused the prolongation of labor. In estimating the influence of prolonged second stage of labor on the fetus, it was found that when labor lasts from three to four hours, the number of children born asphyxiated is increased three times, and the number of fatalities is doubled. When labor is prolonged from four to six hours in the second stage, the number of asphyxiated children is increased six times, and the mortality is quadrupled; and when the second stage lasts more than six hours, the number of asphyxiations and deaths is increased more than seven times.

The influence of primiparity is seen when we find that in uncomplicated vertex presentations four times as many children are lost in primiparæ as in multiparæ, through birth pressure. This increases with the age of the mother, rising between twenty-eight and thirty years of age from 4 per cent., to 6.73 per cent., between thirty-six and forty-four years of age.

In general, it may be stated that the fetal mortality in prolonged labor is increased from two to three times above the average.

As regards the mother, the mortality and morbidity increase with the length of the second stage of labor. The necessity for operative interference is increased, and the lacerations are correspondingly frequent.

An example of this may be found in the statistics showing that in 10,000 labors the average application of forceps was 2 per cent.; but when the period of expulsion was more than six hours in length the frequency of forceps application was increased seventeen times. The maternal morbidity increased from 2.9 per cent. to 10.7 per cent.; and when the expulsive period of labor was more than six hours, it was three times its ordinary proportion. The mortality increased to above 2 per cent. under these conditions. Here again the age of the mother increased the morbidity and mortality, and operative interference, proportionately.

An effort was made to trace the mortality of children, and it was found that in all uncomplicated head presentations there was a general mortality among the children of 1 per cent., and of these one-half obtained when the expulsive period of labor lasted longer than one hour.

These facts are important, because this mortality among children occurs at a time when interference is usually successful.

When one turns to what is styled secondary resistance of the soft parts, one comes to cases of placenta prævia, eclampsia, prolapse of the cord, and transverse presentation. These comprise 220 cases, with a mortality of 29.4 per cent. Contracted pelvis was credited with a fetal mortality of 20 per cent.; resistance of the soft parts only $33\frac{1}{3}$ per cent.; and secondary obstruction caused by complications, to more than 25 per cent.

If one combines primary and secondary resistance of the birth canal,

it is found that two-thirds of all children perishing in labor die from this cause, which makes a general mortality of from 2 to 3 per cent.

When the question of *treatment* is concerned, *vaginal hysterotomy* is discussed. In 6500 hospital and polyclinic cases, the operation was done seventy times with a maternal mortality of 2—one from severe eclampsia, and one from pneumonia. Fourteen per cent. had the puerperal period complicated by fever. Among the children, there were 46 fully viable, of whom 12 had already died in labor—3 from eclampsia, 3 from premature separation of the placenta, 3 from placenta prævia, and 3 from resistance of a rigid os. It is thought that these last could have been saved by prompt operation. One child died after difficult forceps operation from cerebral hemorrhage; one had fracture of the spinal column during extraction; and there were 2 children not fully viable, who died soon after birth. Of the children viable and in good condition at the time of operation, 88 per cent. survived.

When the obstruction is in the lower portion of the genital tract, the results of forceps application in 3813 cases were studied. Frequency of lacerations varied from 67 to 56 per cent. This would confirm Leopold's observation that the application of forceps is the bloodiest of all obstetric operations. The mortality ranged from 3.3 per cent. to 2.3 per cent. In proportion as antiseptic precautions were perfectly carried out, it was found that the use of forceps did not greatly increase the mother's danger.

As regards the child, its principal danger arises from pressure upon the umbilical cord, and irritation of the respiratory organs through pressure. In general, it is considered that slowing of the fetal heart sounds is an indication for interference, especially in all cases in which one cannot frequently and accurately count the heart sounds, and in which labor does not terminate spontaneously in a reasonably short time.

An analysis of the statistics shows that, in the last thirty years, the maternal mortality after forceps operation has greatly lessened, and varies now from 0.5 per cent. to 1.16 per cent.

The lessening of fetal mortality in labor must surely follow improvement in technique in the use of forceps, and the more common application of the instrument.

As regards obstruction to labor in the upper portion of the birth canal, he reports 6 cases among primiparæ, and 7 among multiparæ. All of the mothers recovered; 3 had fever in the puerperal period, of whom one was infected before operation; one patient had fever during labor, but was entirely without it in the puerperal period, 3 of the children died—one after difficult delivery, 9 were born living, and discharged healthy. In the cases of premature separation of the normally situated placenta, 5 are reported treated by vaginal hysterotomy, with the recovery of the mother; 14 cases of placenta prævia are

reported so treated, with the recovery of all the mothers; and but one case in which there was fever in the puerperal period. Of the 15 children, 2 were premature, 3 had died before delivery, and 1 during operation; the remaining 9 making good recoveries.

In eclampsia, 10 cases were treated, one of whom died soon after delivery, 9 recovering, of whom but one had slight fever in the puerperal period.

The fetal mortality of eclampsia is usually believed to be 35 to 40 per cent. Of 5 children that were living at the time of operation, and viable, all were saved; 2 of the children were not viable, and 3 had perished before operation.

Three cases of vaginal hysterotomy for prolapse of the cord are reported, with the saving of all 3 of the children; 85 children were born after transverse presentation, of whom 40 perished. Of these, fully one-half died because of the partially dilated condition of the cervix.

It is thought that vaginal hysterotomy, in cases in which the cervix is not dilated, and the membranes have ruptured, makes it possible to perform version and extraction promptly, and thus to save the child. In cases in which the os does not dilate because of spasm of the cervix, and the child's head is grasped, this operation enables the physician to rapidly deliver; and the same is true when a contraction ring is present. It does not seem unreasonable to believe that from one-third to one-half of children previously lost from this complication, may thus be saved.

The maternal mortality of transverse presentation was 4.5 per cent.

In all, 35 patients were treated because of secondary obstruction in the soft parts; 5 cases of premature separation of the placenta, 15 of placenta prævia, 10 of eclampsia, 3 of prolapse of the cord, and 2 of transverse presentation. One severe case of eclampsia died, and 4 patients had fever in the puerperal period, of whom 2 were infected before the operation; 18 of the children were born living, and made good recoveries.

Two cases of contracted pelvis are reported, in which hysterotomy was combined with pubiotomy. Both of these operations were successful. Cases are also reported of pyelitis, pulmonary tuberculosis, and pernicious nausea—20 in all—of whom one perished from pneumonia; 5 had fever during the puerperal period, and 12 were cases of pyelitis complicating pregnancy. There was one case of abortion occasioned by fever, which was present before the operation.

In reviewing the statistics of various clinics it is found that the fetal mortality from classes of cases reported varied from 2.28 per cent. to 3.9 per cent.; septic maternal mortality was 0.11 per cent.

A progressive improvement has taken place in the mortality of children born in cases so complicated.

Sacral Anesthesia during Labor. Reilander¹ reports 46 primiparæ and 19 multiparæ treated by the application of cocaine, followed by epidural injections of novocain and suprarenal solution, this group comprising 23 cases; and 42 cases treated by the injection of alypin and suprarenal solution.

In the first group of cases, 5 drops of a 20 per cent. cocaine solution were applied to the nasal mucous membrane. The injection was made so soon as the cervix was dilated and abdominal pressure was forcing the child upon the perineum. In 4 cases the nasal treatment produced a profuse flow of tears, sneezing, a bitter taste in the mouth, cough, and a tendency to vomit. The abdominal pain was less in 2 patients after the nasal application; in 2 patients it increased, and in the remaining cases it was unaltered. Pain in the back was less in 3 cases, remaining unaltered in 19, and increased in 1. The application to the nasal mucous membrane alone did not influence labor pains. The epidural injection of novocain and suprarenal solution was a 5 per cent. solution, with salt solution. The injection was given at a time when the expulsive efforts were strong, and was most successful from half an hour to two hours before the birth of the infant. The patient was turned upon the left side and the sacral region utilized for the injection.

If the results of this combined treatment are summed up, it is found that in 23 cases, uterine contractions were made stronger in 10, and abdominal pressure was lessened in 11; in 4 patients the forceps were used. Pains in the back were made less in 16 cases, and abdominal pain was lessened in 11; 4 of the children were born apparently asphyxiated, but were revived.

In the second series, 1 per cent. of alypin solution in physiological salt solution was prepared, to which were added a few drops of suprarenal solution. In no case was the forceps used; in 6 patients the pains seemed to be less; and in 3 cases the abdominal pressure was decreased. In more than one-half of the patients the pain and suffering of parturition was distinctly lessened.

The third stage of labor was not especially altered in both series. There was no profuse hemorrhage. The puerperal period was not influenced unfavorably, nor was the child injured. There seemed to be some relaxation of the pelvic floor.

So far as the relief of pain was concerned, in 4 of the 42 cases labor was reported as absolutely without pain. The suffering was much lessened in 12, somewhat reduced in 11, uninfluenced in 14, while 1 patient thought that her suffering was markedly increased.

The Histological Elements Present in the Scar in Lacerations of the Perineum. Stern² has examined scar tissue removed in operations

¹ Zentralblatt für Gynäkologie, 1910, No. 13.

² Zeitschrift für Geburtshülfe und Gynäkologie, 1910, Band lxxvii, Heft 2.

for the repair of lacerations of the perineum to observe what histological elements are present in the scar.

The operation performed consisted in removing the entire vaginal and perineal scar, drawing asunder the edges of the wound, and isolating and closing the muscular fibers separately, and the fascia and connective tissue. In one case of extensive laceration, the scar upon the patient's right side showed a thick network of elastic fibers; from the opposite side the scar tissue showed a very much smaller number of elastic fibers. In 4 other cases, a similar difference was found in the scar, taken from the two sides.

This examination of scar tissue bears out Küstner's theory that lacerations of the pelvic floor are not symmetrical, and that the situation of the greatest laceration enables one to determine the mechanism of labor.

The Secondary Repair of Complete Perineal Lacerations. Ill¹ describes a flap splitting operation for complete laceration of the perineum. The operation is essentially a Tait-Sänger operation, consisting of six distinct steps: (1) Two lateral and one transverse incision outlining a quadrangle complete on three sides; (2) splitting the flap thus outlined; (3) suture of the rectum; (4) suture of the perineum; (5) suture of the vagina; (6) twisting of the perineal sutures.

The material used in closing the rectal mucous membrane is the finest plain catgut, inserted upon a fine, slightly curved needle. The suture begins in the middle of the posterior wound, and never touches the mucous membrane of the intestine. It is entirely buried in the raw surface, each end of the suture being threaded into the needle, with which a double line suture is made. For the perineum a very pliable silver wire is employed. This is inserted by a curved, round needle at the border of the wound so that no skin will be drawn into the wound. The first suture is passed just within the curve of the sphincter; the second through the sphincter itself; and the third, just anterior to the sphincter. The sutures will rarely appear in the wound.

For closing the vagina, a medium-sized plain catgut is used. The silver wires are held together by a piece of fine rubber tubing, and the sutures are cut on the ninth day, and removed on the next day.

The bowels are moved by salines in forty-eight hours, preceded by an injection of olive oil. During the movement of the bowels the patient is turned on her left side, and the nurse makes pressure toward the new perineum with her left hand, while the right hand carefully opens the anus. During convalescence the bowels are moved every second day. The use of the catheter is avoided.

The diet, during the first week, should leave as little residue as possible. The patient gets up on the eighteenth day, and the first evidence of success from the operation is the patient's ability to retain gas.

¹ American Journal of Obstetrics, January, 1911.

Hemorrhage from Spontaneous Rupture of a Vaginal Varix. Purslow and Branson¹ report the case of a patient eight months in her first pregnancy, who was seized with profuse hemorrhage from the vagina when she first got out of bed in the morning. The patient lost so much blood that she became greatly collapsed. There was no evidence of labor, and when the patient was seen the hemorrhage had ceased.

The case was thought to be placenta prævia, and the vagina was firmly packed and the patient removed by ambulance to the hospital. Upon removing the vaginal packing on the next day, bleeding immediately occurred. Upon inserting a speculum, and sponging the tissues, the bleeding came in a profuse stream from a point about an inch and a half above the urethral orifice, and slightly to the left of the median line. Under anesthesia, the hemorrhage was traced to a varicose vein. The ruptured portion was drawn away from the vaginal wall, an incision made through the mucous membrane around it, and several veins which appeared to form a small plexus were ligated and excised. The tissue removed was examined microscopically and found to be a varicose vein, with marked thinning of the wall at the site of rupture. The bleeding did not return, and the patient recovered, but had to be catheterized for retention of urine.

From the time of the hemorrhage, fetal heart sounds and movements could not be detected, and the patient was ultimately delivered spontaneously of a macerated fetus. There were no varicose veins in other portions of the body.

Labor Obstructed by Pelvic Tumors. Stern² quotes Riemann's account of a primipara whose labor was complicated by a tumor in the small pelvis which obstructed the birth of the child. Upon rectal examination, a cyst as large as a good-sized goose egg was found in the hollow of the sacrum, wedged between the head and the pelvis, and efforts to replace it failed. Under anesthesia, the cervix was incised and the child delivered with difficulty by forceps. It did not survive its birth.

The tumor disappeared during delivery and could not afterward be detected. From the seventh to the twelfth day of the puerperal period the patient had chills and considerable fever. She ultimately made a good recovery.

Stern reports the case of a primipara whose labor was delayed by a cystic tumor in the pelvis. This was reduced in size by a puncture, when the tumor was found to contain some solid material in addition. As the child's head seemed to be small, the forceps was applied at the pelvic brim and the head brought down by very strong traction. The head descended suddenly, the child being born alive. The tumor could not be found.

¹ British Medical Journal, February 5, 1910.

² Archiv für Gynäkologie, 1910, Band xci, Heft 2.

The patient developed peritonitis and was operated upon by section on the eleventh day. Upon opening the abdomen, extensive peritonitis was found to be present. On the right side was a dermoid tumor as large as a fist, with purulent fluid escaping from a rent in the tumor. The patient did not long survive the operation.

A second case of cystic tumor complicating labor is reported in which the tumor was so forced to one side of the pelvis that it seemed possible to apply the forceps. Delivery seemed imperative because the patient had fever and seemed greatly prostrated. The effort to use forceps was unsuccessful, and the patient was operated upon by suprasymphyseal section. A living child was delivered and the patient recovered.

The case of a multipara, aged thirty years, is also described, in which the mother was admitted to the hospital with fever, demanding prompt delivery. The forceps was applied in the right oblique diameter, but the head presented very slowly with strong traction. The obstruction seemed to be at the side of the rectum. The forceps was removed, and another application made, when the tissues were ruptured and a tumor was expelled as large as a goose egg. The pedicle of the tumor extended to a point behind the cervix on the right side. The pedicle was ligated and the tumor removed, when the child was immediately delivered alive.

Upon examination, lacerations were found opening the posterior cul-de-sac, and the pedicle of a tumor from the right ovary could be detected. Lacerations had occurred on both sides of the vaginal attachment to the cervix. These were drained by gauze and the sphincter of the bowel which had been torn, was repaired. The patient ultimately recovered.

Stern concludes that in cases of pelvic tumor complicating labor, an effort should be made with the patient in the knee-chest posture to replace the tumor. Puncture should only be employed in those tumors which can be distinctly recognized as cystic, and if possible it should be limited to tumors containing serous fluid only. If the tumor is very low in the pelvis, and with a distinct pedicle, it may be removed by incising the posterior vaginal wall.

The safest procedure for the mother is the suprasymphyseal section without removal of the tumor, as the classic Cesarean section and removal of the tumor are often followed by a bad result in many of these cases which are infected.

It is surprising to find the views stated above entertained at present by one who has hospital facilities for operation. There is abundant experience to prove that tumors complicating labor, in the vast majority of cases, are most safely dealt with, so soon as their presence is discovered, by abdominal section. After the removal of the tumor, the child may be delivered through the vagina, or by uterine section, as the operator may elect.

Labor in Contracted Pelvis. Yamasaki¹ reports 390 cases of labor in contracted pelvis in which the true conjugate was 10 cm. and under; and 370 cases in which the external conjugate was 18 cm. and under.

Among these there were 47 cases of flat pelvis with a true conjugate of from 10 to 9.6 cm. Of these, 20 were primiparæ, with 18 spontaneous labors, 2 terminated by operation, and both with the application of forceps, one being at the brim of the pelvis.

In the first case, the child was lost by birth pressure; and in the second case, the child survived. There was extensive laceration in both cases.

In the multiparæ with flat pelvis, there were 27 cases—21 spontaneous births, and 6 requiring operation. Version was practised twice, in one case the right clavicle of the fetus being fractured. Perforation was performed twice; labor was induced once, with the loss of the child, and pubiotomy was once performed with rupture of the subpubic ligament, and the birth of a living child. None of the mothers perished, and 3 of the children.

There were 140 births in flat pelvis, with a true conjugate of from 9.5 to 8.5 cm. Of these, 54 were primiparæ and 86 multiparæ. Among the primiparæ there were 43 spontaneous labors, with no maternal death, and three fetal deaths.

Among the operations performed were three applications of the forceps; 1 version, 5 craniotomies, and 2 extraperitoneal sections. None of the mothers perished, but 7 of the children were lost. One of the mothers after suprasymphyseal section had mastitis and stitch abscess. The second had extensive suppuration of the wound, pus being discharged through the vagina. This patient also had mastitis.

Among the 86 multiparæ with flat pelvis there were 42 spontaneous births and 44 operations. None of the mothers perished in spontaneous labor, but one of the children was lost through birth pressure.

Among the operations were 2 low applications of the forceps, 2 high applications of the forceps, 3 extractions in breech presentation, 12 versions and extractions, 3 craniotomies, 10 inductions of labor, 8 pubiotomies, 1 classic Cesarean section, with transverse incision of the fundus, 1 celiohysterectomy, and 3 suprasymphyseal sections.

Among these 44 patients, 3 mothers died, 1 after the induction of labor, 1 from hemorrhage after version and extraction, and 1 from embolism after pubiotomy; 4 had the puerperal period complicated by fever; 12 of the children were lost, 1 from high forceps, 4 after version and extraction, 4 by induced labor, and 3 by craniotomy. There were 104 cases of flat pelvis with a true conjugate of from 8.4 to 7 cm., and among these were 35 primiparæ and 69 multiparæ. Of the primiparæ, 20 had spontaneous labor, and 15 were delivered by operation. One of the children died in spontaneous labor, but none of the mothers.

¹ Archiv für Gynäkologie, 1910, Band xci, Heft 2.

Among the cases delivered by operation, forceps was applied three times, extraction by the breech once, craniotomy five times, symphysiotomy once, pubiotomy once, celiohysterotomy once, celiohysterectomy once, and suprasymphiseal section twice. None of the mothers operated upon died, but 6 of the children perished—1 in induced labor, 4 were dead when the mother was admitted to the hospital, and 1 was destroyed by craniotomy.

In the multiparæ, in 69 cases, 15 had spontaneous labor, and 54 were delivered by operation. None of the mothers died in spontaneous labor, but 1 of the children. The operations consisted of high forceps once, extraction by the legs and feet twice, version seven times, induced labor five times, craniotomy twice, pubiotomy nineteen times, Cesarean section, intraperitoneal, eleven times, and extraperitoneal section seven times. Two of these mothers perished, 1 after induced labor, and 1 after the conservative Cesarean section. Eleven of the children died, 1 from craniotomy, and the others from birth pressure.

There were 12 cases of flat pelves with a true conjugate of from 6.9 to 5.5 cm.; 6 of these were primiparæ and 6 multiparæ. None of the mothers had spontaneous labor, and among the primiparæ craniotomy was done once, pubiotomy once, celiohysterotomy once, celiohysterectomy once, and extraperitoneal section once. One mother died after extraperitoneal section from sepsis. Two of the children perished, one before the mother was brought to hospital, and the other about two weeks after delivery by Cesarean section.

The multiparæ were delivered by Cesarean section in 5 cases by the Porro operation, and in 1 case by extraperitoneal section. All of the mothers and children recovered.

There were 227 cases of flat pelves with an external conjugate of from 18 to 16 cm., and among these were 150 primiparæ and 77 multiparæ. Among the primiparæ were 133 cases of spontaneous labor, with no maternal deaths, and 5 fetal deaths, 2 from asphyxia, 1 from premature placental separation, 1 before labor, and the other from birth pressure during labor. Ten cases were delivered by forceps, 6 by craniotomy, and 1 by embryotomy. None of the mothers perished, and 11 of the children.

Among the 77 multiparæ, there were 61 spontaneous labors, and 16 operations performed. None of the mothers died after spontaneous labor, and 2 of the children; while among the operations were 3 applications of forceps, 2 extractions by the feet, 2 craniotomies, 2 induced labors, 4 versions, and 3 Cesarean operations, 1 of which was suprasymphiseal. None of the mothers perished, and 6 of the children.

In addition to the flat pelves, there were 26 cases of justominor or symmetrically contracted pelves with a true conjugate of from 10 to 9 cm. Among these were 18 primiparæ with 17 spontaneous labors, with no maternal deaths.

It is interesting to note that of these patients none was over thirty years of age, and that 6 were under twenty years of age. The children were born living. One case was treated by craniotomy because the mother showed fever during labor. There were 8 multiparæ with symmetrically contracted pelves, of whom 7 had spontaneous labor without complication for mother or child. One case was delivered successfully by forceps.

There were 48 cases of symmetrically contracted pelves, with a true conjugate of from 8.9 to 7.5 cm., of whom 18 were primiparæ, and 30 multiparæ; 10 of the primiparæ had spontaneous labor, and 8 had some operation. The spontaneous labors resulted successfully for both mother and child. The operations consisted of 4 applications of forceps, 1 version, 1 craniotomy, and 2 celiohysterotomies. None of the mothers died, and 2 of the children.

Among the 14 multiparæ, there were but 2 spontaneous labors; both mothers recovering; 1 of the children died and 1 survived.

Sixteen of these cases were treated by operation. Version was performed in 6 cases, craniotomy in 3, induced labor in 2, pubiotomy in 4, and Cesarean section by the Porro method in 1. There was no maternal mortality, and 5 of the children were lost.

In the symmetrically contracted pelves with a true conjugate of from 7.4 to 5.5 cm., there were 13 cases—8 primiparæ, and 5 multiparæ. But 1 of the primiparæ delivered herself spontaneously, with the death of the child soon after. Among the operations were 1 application of forceps, 2 craniotomies, and 4 Cesarean sections. One of the mothers died in collapse, and 2 of the children.

Among the primiparæ, there was 1 spontaneous birth, with a good result, and 4 operations—1 version and 3 Cesarean sections. The results were good for both mother and child.

With the symmetrically contracted pelves, with an external conjugate of from 18 to 14 cm., there were 143 cases; 107 primiparæ and 36 multiparæ; 95 of the primiparæ had spontaneous labor, with no maternal death, and the death of 1 child.

Among the 12 cases operated upon were 8 applications of the forceps, 3 craniotomies, and 1 Cesarean section, with no maternal mortality, and 4 deaths of the children. In the 36 multiparæ, there were 31 spontaneous births, without mortality, 2 forceps applications, 2 versions, and 1 Cesarean section without mortality.

In reviewing the entire series of 760 cases of contracted pelves, this does not constitute the entire number, as among these are not reckoned cases of contracted pelves complicated by anomalies of the placenta, eclampsia, organic disease, malformation, or changes in the soft parts; or cases where dead and macerated children were delivered. When these are included, the number is 808 in 6038 cases of labor—a frequency of 13.4 per cent. The ratio between the justominor and flat pelvis

was 1 to 2.3, or 30.7 per cent. to 69.3 per cent. of all contracted pelves. Among the 760 cases there were 416 primiparæ and 344 multiparæ; while in 390 cases reckoned by examination of the external conjugate only, the proportion is reversed, there being 159 primiparæ to 231 multiparæ.

As regards cases of spontaneous birth in flat pelves the largest child weighed 3284 grams in a multipara having a true conjugate between 10 and 9 cm. Among the cases delivered by operation, the largest child weighed 3700 grams in a primipara having a flat pelvis, with a true conjugate between 10 and 9.6 cm. In cases in which the external conjugate was measured, the largest child in flat pelvis having an external conjugate of 18 cm. weighed 3306 grams, born in spontaneous labor, the mother being a multipara; while by operative delivery the largest child weighed 3289 grams in a similar patient.

The average weight of the children in primiparæ ranged from 2617 to 3700 grams, and in all cases delivered spontaneously and by operation, the average was 3026 grams. In multiparæ, the children were larger, the average being 3282 grams. In a whole series of cases, the average weight of the children was 3131 grams.

It is of interest to note that the larger children were found in patients having flat pelves. The labor was longer when spontaneous, the greater the pelvic contractions. In the whole series, 69.6 per cent. terminated by spontaneous labor, and 30.4 per cent. by operation. This does not differ very widely from the reports of other clinics. The spontaneous labors were more frequent among primiparæ—81 per cent., with 19 per cent. of operations. Among the multiparæ, the spontaneous labors were 55.8, with 44.2 per cent. of operations. This may be accounted for from the stronger uterine muscle of the primiparous woman and the smaller size of her children.

The maternal mortality was 0.92 per cent. from all causes; the morbidity was 14.3 per cent. Among the children, 89.8 per cent. were born living, and 11.2 per cent. died during birth or soon after. Spontaneous births had a fetal mortality of 2.5 per cent., and operative delivery a fetal mortality of 30.9 per cent.

Considering the mortality of the different operations, the application of forceps when the head was below the brim of the pelvis and well engaged, resulted in the death of no mother; 7 of the children were lost. There were 4 cases of facial paralysis among the children. In 2 cases the use of Walcher's position assisted in delivery. In the high application of forceps there was no maternal death in 10 cases, and 3 fetal deaths. In extraction by the breech, there were 7 cases, with no maternal deaths, and 4 fetal deaths. In transverse presentation treated by version there were 4 cases, with no maternal death, but with 3 fetal deaths. Podalic version was performed in head presentations thirty-two times. In 4 of these cases Gigli's saw was inserted

before version, with the intention of opening the pelvic girdle should there be difficulty in extracting the head, but in none of these cases was it necessary. One of the mothers died from hemorrhage, and 8 of the children died. In 35 craniotomies, 17 children were dead before the operation. None of the mothers died, and none was severely injured. In 1 case, craniotomy was done upon the aftercoming head with a good result for the mother; and in another case embryotomy was performed for impacted shoulder presentation with transverse position. In 20 cases of induction of labor, none was performed upon a primipara. There were 3 spontaneous labors following the induction of labor, and 17 operations. Two of the mothers died, and 2 of the children were injured—1 with both humeri fractured, and 1 with a clavicle fractured; 8 died soon after or during birth. Symphyseotomy was done but once, with a good result for mother and child. Pubiotomy was done thirty-four times, with no maternal death, and 1 fetal death. The mortality after pubiotomy was not as high as that reported by many other operators. There were 11 cases of celiohysterotomy, in 2 of which the tubes were removed to sterilize the mother. One mother died four days after labor from septic infection, and none of the children was lost. In 26 Porro operations, 1 died from heart failure six hours after delivery. One child died nineteen days after birth from pneumonia. There were 17 suprasymphyseal sections with 1 maternal death in a patient infected before admission. In this case, a longitudinal incision was made in the peritoneum. One of the children in these cases was lost.

The Treatment of Labor in Contracted Pelvis. Menge¹ would simplify the treatment of labor in contracted pelvis by the following rules: Whether the child be living or dead, all cases of highly contracted pelvis should be sent to the hospital. The lesser grades of contracted pelvis should be sent to hospital if the child is living. The general practitioner may attempt to treat in the house of a patient cases of moderate contraction in which the child is delivered, and also cases of slight pelvic contraction. In the latter, whether he selects the induction of labor, prophylactic version, or high forceps, he must practice a strict conservative asepsis, and use every effort to obtain spontaneous labor in cases in which the head is presenting. Interference should be practised only for the most stringent reasons. If spontaneous labor does not occur in cases in which the head presents, he should send the patient to a hospital, or perform craniotomy upon the living child.

Von Franque,² from his experience in the clinics in Prague and Giessen, has limited his use of induced labor, prophylactic version, and high forceps, and has performed Cesarean and pelvic section more frequently than in former years. He has lost but one mother from pulmonary embolism, and 4.24 per cent. of the children. In cases of

¹ Monatsschrift für Geburtshülfe und Gynäkologie, 1910, Band xxxi, Heft 6.

² Ibid.

moderate pelvic contraction, conservative treatment was without mortality. He believes that all patients with contracted pelvis should be sent to the hospital, as the important operations cannot be properly performed in a private house, and even the complications of induced labor may become serious. If this cannot be accomplished, then some cases may be saved by timely prophylactic version and the application of forceps. He believes that pubiotomy and extraperitoneal section are of definite value; they should increase the number of spontaneous labors in contracted pelvis and decrease the frequency of craniotomy.

Stoeckel¹ believes that the general practitioner in treating cases of contracted pelvis should practise the older methods of delivery. He believes that with care, induced labor may be successfully conducted in a private house. He would not employ bougies, but the dilating bag. Induced labor, however, may be attended by serious complications, which require the strictest antiseptic precautions and considerable experience. Prophylactic version should not be undertaken by the general practitioner, and the high forceps, he thinks, should never be attempted by the general practitioner. In dangerous cases the practitioner should perform craniotomy rather than attempt other operations.

In choosing the major obstetric operations, the measurement of the true conjugate cannot be relied upon for a definite decision. The course of labor, and the clinical history of the case are of importance. Pubiotomy is only reliable in multiparous patients where the child has the head presenting, or can be brought into that position. He prefers Bumm's method of performing this operation. He would use Latzko's method of extraperitoneal section, and believes that we cannot yet place a definite limit for pubiotomy and extraperitoneal section. Pubiotomy should not be condemned, as it serves in appropriate cases a useful purpose.

In 19 pubiotomies he had no mortality. In 1 case there was a subcutaneous injury to the sphincter of the bladder; 2 children were lost from asphyxia.

In discussing this paper, Hofmeier was strongly in favor of sending complicated cases of labor to the hospital. He would strictly limit the induction of labor, and believes that in uninfected cases the classic Cesarean section gives the best chance for mother and child.

Franz² has observed that, among primiparæ having pelves with a true conjugate as large as 8 cm., 80 per cent. have spontaneous labor; while among multiparæ with similar pelves about 60 per cent. have spontaneous labor.

In selecting operative treatment, Franz has abandoned prophylactic version and induced labor because of the mortality of the children. He also declines to make the high application of forceps, and only

¹ Monatschrift für Geburtshülfe und Gynäkologie, 1910, Band xxxi, Heft 5.

² Ibid., Heft 2.

uses this instrument when the head is engaged and moulded. When the forceps fails, he does craniotomy, and reserves pubiotomy for multiparæ, because of the lacerations which accompany the operation in primiparæ. He believes that symphyseotomy by the open operation is the best procedure. He would perform the classic Cesarean section in cases which were not infected, and would reserve the extraperitoneal section for those in which there was danger of infection. In these latter cases he believes that there is no choice between the extraperitoneal and transperitoneal operation. The danger lies through infection in the connective tissue.

Ferroni¹ gives the results of his experience in the treatment of contracted pelvis in the clinic at Parma. His cases in three years numbered 174, among which spontaneous labor occurred in 37.7 per cent., vaginal delivery by forceps or version in 11.8 per cent., and pubiotomy and Cesarean section in 15 per cent., giving a mortality for the mother of 1.1 per cent., and for the fetus of 9.5 per cent.

Metzler² reviews the treatment of contracted pelvis in Wyder's clinic at Zurich. As regards the methods of delivery, the rule is to wait for and encourage spontaneous labor so long as there is a possibility of its occurrence, and to interfere only when there is danger to the mother or to the child, or to both. In 439 cases, spontaneous labor occurred in 82.83 per cent. This is practically the average reported by other clinics having a large number of patients; 9 children were stillborn in spontaneous labor, 1.7 per cent. One of these was a case of melæna neonatorum, and 1 had sclerema neonatorum, both of which can scarcely be referred to contracted pelvis as an exciting cause. One of the mothers died from pleuropneumonia and tubercular meningitis.

There were 91 cases in which operation was performed, with a maternal mortality of 2.19 per cent. and a fetal mortality of 28.57 per cent. Among these cases were 18 applications of the forceps when the head was engaged and partially descended, with no maternal mortality, and the death of 3 children. The high application of forceps was made in 10 cases, with the death of 1 child, and no maternal mortality. Cephalic version was performed as often as podalic, the mortality for the children being 20 per cent. There was no maternal mortality. There were 7 cases of extraction, with the death of 2 children, and no maternal mortality. Perforation was performed eight times, or 1 in 0.51 per cent. of all labors in contracted pelvis, and in 3 cases the operation was performed upon living children. Labor was induced in 12 patients with the death of no mother, but with the loss of 6 children, with a mortality of 50 per cent.

In considering Cesarean section and pubiotomy, both are considered as operations for the hospital only. Cesarean section was performed

¹ *Annali di Ostetricia*, 1910, No. 2.

² *Archiv für Gynäkologie*, 1910, Band xc, Heft 3.

four times, with no fetal mortality, and the death of 1 mother; pubiotomy seven times, with the death of 1 mother, and the death of 1 child.

Mariton¹ has studied the occurrence of spontaneous labor in contracted pelvis, especially those of the rachitic type. He finds that when the true conjugate is more than 9 cm. there is every reason to expect a spontaneous expulsion of the child. These cases comprise the greater number of patients having contracted pelvis. When the true conjugate is less than 8 cm., spontaneous birth is the exception, and does not occur more often than twenty-five times in one hundred. Between the limits, 8 and 9 cm. is a critical point. Some of these cases go on to spontaneous labor, while others require operation. Where the true conjugate is 8.5 cm., spontaneous birth occurs in not more than one-half of the cases.

The question of primiparity or multiparity exerts some influence upon spontaneous labor, in the proportion of 10 to 11 in 100 cases. The size of the child influences the development of spontaneous labor very considerably. The smaller the fetus, the more apt is spontaneous birth to occur. If the pelvis with a true conjugate is more than 9 cm., spontaneous birth occurs in 80 per cent. of cases, independently of the size of the child. Below 8 cm. it is unusual to find spontaneous labor in children weighing more than 2500 grams, which corresponds to the eighth month of intrauterine life. From 8.1 cm. to 8.5 cm., spontaneous labor occurs with children weighing from 2500 to 3000 grams. Spontaneous birth is usual where the true conjugate is 8.6 to 9 cm., with children weighing 3000 grams. The fetal mortality with a true conjugate of from 9 cm. to 8.6 cm. ranges from 8 to 10 per cent. As the true conjugate becomes less than 8 cm., the fetal mortality grows to 30 per cent., but it did not seem greatly influenced by the parity of the patient. The fetal mortality increased as the weight of the child increased.

When one considers the mortality of children in spontaneous birth in contracted pelvis, it is low in those whose true conjugate is not less than 9 cm., being but 9 or 10 per cent. If the mortality rises to 20 per cent. in moderately contracted pelvis, and in those extremely contracted to 100 per cent., a corresponding increase in the mortality accompanies the greater weight in the children.

The Induction of Labor. Little² believes that the timely induction of labor in cases in which the reasons for interference are ascertained by careful observation, will prevent many of the complications of parturition. His method consisted in inserting a large, soft bougie with the aid of a stilette. Pelvic contraction is not to be considered as an indication for the induction of labor. The prolongation of pregnancy is more often a reason for the adoption of this method of treatment. Usually the passage of the bougie and the introduction of the pack

¹ *L'Obstétrique*, October, 1910.

² *Journal of Obstetrics and Gynecology of the British Empire*, September, 1910.

will bring on pains within a few hours, and labor may be allowed to proceed or terminate artificially. When the cervical canal is obliterated, Harris' method of dilatation is usually easy, and, when care is exercised, is reasonably safe. The danger from hemorrhage and infection is slight, but lacerations of the cervix will occur frequently, and such lacerations should be immediately repaired. This method has, among others, the great advantage of enabling the operator to recognize, by the resistance experienced, the degree of force which it is necessary and safe to employ. There were 46 cases of induction of labor in 3000 parturitions; spontaneous labor in 23 cases, and delivery by operation in 23; 4 of the 46 patients died.

The morbidity was 6 in 46 cases. There were 19 fetal deaths; 54 patients were treated by dilatation of the cervix after its obliteration, and among these patients were 5 deaths—3 from eclampsia, 1 from placenta prævia, and 1 after pubiotomy. The cervix was lacerated in 71 per cent. of the cases; 30 cases were treated by immediate suture, in the great majority of which satisfactory union occurred. The Pomeroy bag caused tearing of the cervix, which healed when sutures were applied.

Little recently had the opportunity to deliver for the second time 2 of the patients who had tears of the cervix immediately repaired. The course of labor was in no way different from the previous labor, which had been normal. No serious hemorrhage followed the lacerations, and 2 cases of hemorrhage followed the rapid emptying of the uterus, but was immediately controlled by the Momburg tube. The puerperal period was normal in 57 per cent.

THE PUERPERAL PERIOD

The Slowing of the Pulse in the Puerperal Period. Lewisohn¹ reviews the literature of the subject, and concludes that the slowing of the pulse in the puerperal period is a phenomenon peculiar to that period. Difficult labor, premature birth, and unnatural labor, prevent the usual slowing of the pulse. There is no connection between the pulse rate in the puerperal period and the temperature. The slow pulse of the parturient woman is seen only in physiologically sound individuals. Such are those who have sound organs, have sustained no appreciable laceration, and have had a spontaneous and normal labor. In many cases the slow pulse disappears when the patient gets up, but in others it becomes apparent only after the patient has left her bed. It is a favorable indication that so long as the pulse is slow, the patient's general condition remains good, and a rise of temperature does not occur. The blood pressure is considerably lower in the puerperal period than during pregnancy and often falls after the patient's first

¹ *Monatsschrift für Geburtshilfe und Gynäkologie*, 1910, Band xxxi, Heft 4.

getting up, together with the pulse rate. The blood tension and pulse are, like the pulse and temperature, often affected by the same causes, although not directly dependent upon the same phenomena. The cause of the slow pulse of the puerperal condition is the lessened amount of blood sent to the heart after labor. This results from the slow metabolism, and the heart of the patient is excited to contraction less frequently than is normal

The Care of the Breasts. Bacon¹ contributes a paper upon the management of the breasts in the puerperal period and during lactation. He believes that tuberculosis of the lungs and throat, and serious heart or kidney lesions or other general diseases, should prevent the mother from nursing the child. He believes that unmarried women who have to give up their children must also be included. Syphilis and acute infectious diseases are not generally indications for stopping nursing, nor is the return of menstruation. At any stage, lactation can best be stopped by supplying a support and bandages so as to smoothly and snugly support and compress the breasts. Ice bags may be applied for a day or two, if they give comfort. Ointments, internal medication, and the breast pump are injurious. Massage may be employed when discomfort is great, but the application of ice is equally useful and less troublesome. There is no danger of infection or other injury to the breasts if they be let alone. There is no danger in the presence of milk in the breasts.

During pregnancy the breasts should be thoroughly washed with soap and warm water during the last month, and thoroughly dried and rubbed with a clean towel. The danger of starting labor by these manipulations is exceedingly rare. Ointments and astringents are unnecessary and undesirable. It usually does no good to attempt to draw out the nipples during pregnancy, for this result can usually be obtained after the birth of the child. The time when the child must nurse depends upon its development and strength, as premature children require food soon after birth; while a well-developed child can go for several days without danger. Colostrum, however, is of value, and should be procured for the child if possible. As soon as the breasts become distended they should be supported by a strong muslin binder, notched at the shoulders, and pinned over the shoulders. Massage and the breast pump should be avoided, and need not be used in most cases. No uniform rule can be made for the frequency and regularity of nursing, although ten nursings daily may be taken as an average, each occupying from ten to twenty minutes. One or both breasts may be used, as the child requires.

The diet of the mother is a less important factor than is usually believed, and there is no objection to the use of fruit in plenty. Every effort should be made to have the mother's food taken under favorable circumstances, as the nervous system is very easily disturbed.

¹ Surgery, Gynecology, and Obstetrics, September, 1910.

A chemical examination does not give us much information of value concerning the composition of breast milk.

It can readily be seen that there are abundant sources of contamination for a cracked or fissured nipple from the adjacent skin and the fingers of those who touch the mother and the child. To prevent such, the nipples and the areolar regions are washed thoroughly with soap and warm water before the child is first put to the breast, and afterward once daily. The nipples are covered with four thicknesses of sterile gauze, six to nine inches square, and held in place by a breast bandage. These are changed twice daily, or more often. Immediately after nursing, two or three teaspoonfuls of 60 to 80 per cent. alcohol may be poured over the nipples. This is antiseptic and non-poisonous for the child. It also promotes the healing of slight abrasions. The rule should be for the nurse to touch the nipple as little as possible, and then only with absolutely clean hands. A shield should be used only when the nipples are tender or blistered. A nipple shield for fissured nipples has been found useful.

Special attention should be given to any focus of suppuration on the head or face of the child, as this is frequently a cause of infection of the breast. Such foci should be opened and thoroughly cleaned with alcohol, and the cavity disinfected and covered with collodion. When the Montgomery glands around the areola become infected they should be opened so soon as pus forms, cleaned thoroughly, and sealed with collodion. A slight infection of the breast will produce scarcely any symptoms, while a deeper infection produces general symptoms. Should such develop, disturbance of the breast should be forbidden. The breast should be bandaged, and ice applied. In 90 per cent. of these cases, trouble is aborted by this simple treatment.

If pus forms, the bandage and ice will still furnish great relief from pain. Incision should be practised early under local anesthesia, the incision being small, and a very small wick drain employed. This should be removed in from twenty-four to forty-eight hours.

A large suction cup employed during the dressing assists in drainage, the ice and bandage being used at intervals between the dressings.

Puerperal Hemorrhage. Küstner¹ discusses the subject of late hemorrhage in the puerperal period. Such may happen, even though neither placenta nor membranes be left within the uterus. This is caused by the formation of thrombi which, upon gross examination, cannot be distinguished from portions of the placenta or membranes. To prevent this complication, patients having prolonged, difficult, or abnormal labors, should be kept unusually quiet and carefully watched.

Two illustrative cases are reported, with a microscopic examination of the tissue.

¹ Zeitschrift für Geburtshülfe und Gynäkologie, 1910, Band lxxvii, Heft 2.

Intramural Abscess in the Puerperal Uterus. Intramural abscess in the puerperal uterus, is described by Sampson,¹ who finds not more than 25 in the literature of the subject, divided into those cases in which the uterine abscess or abscesses were the only result of the puerperal infection present; and the other group in which the uterine condition was secondary to a more general infection. The condition is thought to be much more common than is usually supposed. It must be more frequent than is reported, but often is not recognized. The patient may recover without operation; or if operation be performed an abscess may be found in the tissues about the uterus, which is secondary to one in the uterine wall. It is caused by the same factors which bring about general puerperal infection.

The number, size, and distribution of the abscesses resemble very closely those of myoma of the uterus. The patient gives the usual history of puerperal infection which has become chronic. The subjective symptoms may be slight, but occasionally the symptoms are severe. The general signs of infection of a lower grade are usually present. The uterus feels like a myomatous uterus, but the tumors caused by the abscess or abscesses are not as firm as are myomata. Pelvic inflammation may also be present.

The diagnosis must often be made by exclusion, although this may sometimes be directly accomplished by the presence of chronic puerperal infection, and, upon examination, an enlarged uterus with different areas resembling myomata, is found. The cases may terminate by rupture into the uterine cavity, or into the peritoneal cavity, or by extension into the retroperitoneal tissues, into the intestine or bladder, and occasionally into the vagina.

The *treatment* should be operative, all pelvic interference being avoided so long as the infection is acute. Ergot should not be given. After the uterus has been emptied, the pelvis should be let alone, the treatment being addressed to increasing the resistance of the patient and improving her general condition. In the presence of spreading peritonitis, operation will be unsuccessful. If necessary, exploratory incision should be made. If a uterine abscess is found, it should be opened and drained. In multiple abscesses, hysterectomy may be indicated. Although the results of operation are usually fatal, care should be taken to avoid soiling the peritoneal cavity. If the abscess is situated in one of the cornua, a lateral incision may be made, the round ligament exposed and freed and used as a means of drawing the cornu into the incision so that the abscess may be opened.

Early Rising in the Puerperal Period. Velita² reports the results of early rising in the puerperal period in 496 cases; 115 hospital patients were allowed to get up early, and 193 out of 327 coming to the clinic

¹ American Journal of Obstetrics, March, 1910.

² Zentralblatt für Gynäkologie, 1910, No. 25.

in labor from outside; 70 patients were allowed to get up on the fourth day, 112 on the third day, 68 on the second day, and 2 on the first day. At first this was limited to those having had spontaneous labor, but afterward cases of all sorts were included.

Among 174 patients delivered by operation, 70 were allowed to get up without evident injury. Among 84 patients there were lacerations of the cervix, and the vagina had been sutured, the material used being a lead aluminum bronze wire; in 33 cases, the wounds healed by primary union without apparent injury. In 3.8 per cent., among patients who were allowed to get up only a day or two before their discharge, the uterus was well involuted in 40 per cent., and partially involuted in 22.5 per cent.; while in another group were 223 patients who were allowed to get up from the second to the fifth day. The rate of involution seemed better than in the preceding patients.

In the first class—those who got up just before they were discharged, there was rise of temperature in 7.7 per cent. in one group, and in 3.8 per cent. in the other. Among the patients who got up earlier, the percentage of fever was less. Thrombosis and embolism were not observed.

From his experience, Velita now limits the getting up early in the puerperal period to not earlier than the fifth day. At this time, infection, if present, should have declared itself.

The Subinvolved Uterus. Smith¹ has made a careful study of this condition, and gives the results of his observations, with some excellent illustrations. He examined the uterus removed in 8 cases, and found, associated with subinvolution, thinning and lengthening of the uterine ligaments and supporting structures. The tissues of the vagina were usually relaxed, and there was a greater blood supply than under normal conditions. Lacerations were often present.

The exact cause of subinvolution is often impossible to determine. The causes which lead to increased blood supply in the pelvic organs naturally favor subinvolution. Involution should be practically complete at the end of six weeks from labor. If all patients were examined at this time, much could be done to place parturient women in better condition. If lacerations or displacements are found, they should be corrected. Curetting may be done in two or three years after labor to advantage. Amputation of the cervix and excision of a V-shaped wedge may be practised, if necessary. When patients are nearing the menopause, and subinvolution has been present for a number of years, hysterectomy is the best procedure.

The author reports 23 hysterectomies for this condition in patients, the youngest of whom was thirty-five years, the oldest fifty-two years, the average being forty-two years. Nine were suffering from severe hemorrhage, 5 had loss of blood sufficient to warrant interference, and

¹ Surgery, Gynecology, and Obstetrics, January, 1910.

in 9 menstruation was practically normal, if present at all. In 12 cases, the position of the uterus was normal; in 6, there was retroversion; in 4, some tendency to prolapse, and in 1, prolapse with retroversion, but the uterus was very large. There was no mortality or unusual convalescence from the operation. All these patients have been greatly improved in health.

Hysterectomy should be decided upon if the disability from which the patient suffers has been long continued, with severe blood loss, and failure of relief by simple procedures in patients who are at an age when child-bearing is becoming unlikely or impossible, and who have a large and much thickened uterus.

Puerperal Infection. THE ORIGIN AND PREVENTION OF PUERPERAL FEVER. Döderlein¹ discusses the question of preliminary disinfection of the vagina to prevent puerperal septic infection. In his clinic at Tübingen, in 500 cases the vagina was irrigated with one quart of sublimate solution, 1 to 1000, and its walls carefully and cautiously scrubbed with two fingers of the gloved hand. In these cases, internal examinations were made with the gloved hand, the external genital organs were disinfected, and the introduction of microbes from without excluded. During the same period there were 500 cases not subjected to vaginal disinfection. In the 500 disinfected, 12.8 per cent. had fever; while in the 500 not disinfected, but 8 per cent. had fever during the puerperal period.

While allowances are made for other causes than sepsis producing fever, those disinfected showed 10 per cent. rise of temperature, and 6 not disinfected, 5.2 per cent.

In his clinic in Munich, in 460 patients disinfected by a solution of lactic acid, 6.29 per cent. had fever, while in 477 not irrigated, but 3.5 per cent. had fever.

There seems no question but that the preliminary disinfection was a disadvantage rather than a protection. This arises by disturbing the natural protective elements in healthy women. Infection can be lessened by not only cleansing the hands properly, but by the use of gloves.

Döderlein calls attention to a two-fingered examination glove manufactured for this purpose, sterilized by steam at the time of manufacture, and packed in an impervious material.

PNEUMOCOCCUS INFECTION IN THE PUERPERAL PERIOD. Stowe² reports the case of a multipara delivered after some delay by forceps, without lacerations. The child was slightly asphyxiated but easily revived. The mother had had a slight cough for a week before delivery, but no bronchitis. Several days following delivery the patient complained of a sharp pain in the left thigh and leg, but no thrombosed vein could be found, nor was lymphangitis present. The involution

¹ British Medical Journal, October 22, 1910.

² Surgery, Gynecology, and Obstetrics. April, 1910.

of the uterus was normal, and the breasts and nipples were in good condition. There was no evidence of inflammation or infection in the genital tract. Later, pleurisy developed in the right side, with accumulation of fluid, some of which was withdrawn and examined, with a negative result. Lobar pneumonia developed, the patient finally becoming collapsed and markedly cyanotic, with extreme dyspnea. The respirations rose from 30 to 50; the temperature dropped to 96° rectal, and then rose to 103.6° F. The pulse became 140 and very irregular. A pericardial friction sound was heard, with increased cough and expectoration, an area of dulness developed near the junction of the upper and lower lobes posteriorly, and an abscess ruptured into the bronchial tube, when a large quantity of pus was expectorated. The patient gradually improved and made a good recovery.

The blood culture was negative, and pneumococci were found in the cervical secretion and in the sputum.

The treatment consisted in the administration of strychnine and digitalis, the application of an ice bag, and the giving of ammonia carbonate.

The reviewer has recently seen a fatal case of infection of Friedländer's bacillus in a multipara whose husband was dying of pulmonary tuberculosis. The patient had previously been delivered by a very difficult version and extraction. As spontaneous delivery could not be obtained, and the patient earnestly requested relief, she was delivered by celiohysterotomy. On the second day after delivery the temperature rose, and auscultation revealed consolidation first at the base of one lung, and later on both sides. The consolidation extended to the lower two-thirds of both lungs; about a week after the beginning of the pneumonia the temperature fell to 96° and then rose again to 105°.

An examination of the abdominal wound showed evidence of irritation and necrosis about the stitches, part of which were removed. The temperature fluctuated considerably, and a few days later all the stitches were taken out, and the wound carefully strapped. There was no evidence of infection about the generative tract.

After a severe fit of coughing the intestines protruded through the wound, but were replaced and kept in position with sterile gauze soaked in sterile salt solution. It was necessary to dress the patient frequently to keep the intestines within the abdomen. Necrosis of the abdominal wall and omentum gradually developed, with finally, obstruction of the intestines, vomiting, collapse, and death. An autopsy could not be obtained. The patient's child survived and was discharged from the hospital in good condition.

THE OPERATIVE TREATMENT OF PUERPERAL SEPTIC INFECTION. Polak¹ contributes a paper upon the question as to when operation shall be undertaken in puerperal septic infection.

The paper is based upon the clinical study of 200 cases of puerperal

¹ Surgery, Gynecology, and Obstetrics, July, 1910.

sepsis. It was observed that those patients brought to hospital before any surgical treatment had been instituted outside of the hospital but seldom had parametric or peritoneal complications; while in 77 who had been subjected to a curettage or other uterine manipulations, exudates were present or developed shortly after admission in almost all of the cases.

This emphasizes the familiar fact that intrapelvic or intra-uterine manipulations during the acute stage of puerperal sepsis increases the severity of the disease.

In studying these cases after a thorough general examination had been made, including a blood count and a blood culture, the local examination was added, and if the uterus was found well contracted, with closed cervix, it was not disturbed. If the cervix was opened, the cavity of the uterus was explored with the gloved hand and debris removed with the finger, or placental forceps. The uterine cavity was then firmly packed with sterile gauze soaked in pure tincture of iodine, the burning about the vagina and cervix being neutralized by alcohol. This pack was left in the uterus thirty minutes, then withdrawn, and no further intra-uterine manipulation was practised. If the cervix was opened, but the uterus found empty and well contracted, and the endometrium smooth, a single intra-uterine douche of normal salt solution was given. The patient was placed in Fowler's position, ice bags placed over the uterus within the abdominal binder, and ergot given to maintain firm uterine contraction. The bowels were emptied by repeated enemata, and cathartics were not given. Distention was controlled by lavage, enemata, and restricted diet. The Murphy treatment, or saline enemata, were employed to stimulate the action of the kidneys. If the blood was sterile and the leukocytes increased, the prognosis was favorable. If streptococci were found in the blood, and the leukocytes diminished, general infection was present, and a grave prognosis was made.

Vaccines were employed in 7 patients whose blood showed pure streptococci, but without marked effect. Stock vaccines had but little or no influence. So soon as exudates developed the patient improved and the condition of the blood became better. Out of 72 extensive exudates, 65 were completely absorbed under the influence of rest and baking with dry heat. Three of the remainder were opened by extra-peritoneal incision above Poupart's ligament; 4 were opened by vaginal section; 5 cases of ruptured uterus are in the series, of whom 2 died and 3 recovered. There were in all 6 deaths.

Incision of the posterior cul-de-sac and packing with gauze, is considered appropriate only in cases of sepsis following abortion. In these cases, it is possible to shut off the lower pelvis by introducing gauze rolls to the level of the brim, the sigmoid then falling across the brim and completing the separating barrier.

There were 46 cases of putrid endometritis or sapremia, all of whom recovered. These were treated by packing the uterus with iodine soaked gauze, with postural drainage, and ergot.

Exudates occurred in 72 patients in whom only 7 terminated in suppuration. There was no mortality. There were 16 cases of pelvic cellulitis, all of whom had extensive cervical lacerations. The left broad ligament was the site of infection eleven times; the right, five times. In 1 patient only suppuration developed with a fatal termination. In the 15 cases in which resolution occurred, convalescence lasted from four to eight weeks.

Streptococcus was found in the blood of 17 women, and a mixed infection in the blood of 10 women. The uterus was empty and well contracted, but the patients suffered marked prostration, with a temperature of from 102° to 106.5°; the pulse ranged from 110 to 158. One of these cases died of septic endocarditis.

The treatment consisted of support in every way, a copious ingestion of water, saline solution with arsenate of iron, hypodermically, and stimulation by strychnine and alcohol.

In the 5 cases of rupture of the uterus, 2 had pyemia with multiple foci. These abscesses were incised and drained. The stock vaccine was used in these cases without success. In 12 cases of pelvic peritonitis following abortion, incision was made into the cul-de-sac, followed by the introduction of gauze. This was left in position from five to eight days, when it was removed and not replaced. All of these patients recovered, and in 2 of them the abdomen has been subsequently opened and the pelvis found practically free from adhesions; 2 of these cases followed Cesarean section. The colon bacilli were present in many of these patients. There were 5 cases of thrombosis, all of whom recovered. In 3 cases of septic purulent peritonitis, 1 died and 2 recovered. The treatment employed was drainage, starvation, and stimulation.

The general conclusions drawn from these cases are that each must be studied individually, and an accurate diagnosis be made on the clinical, bacteriological, and blood findings. In favorable cases, the infection is localized and circumscribed. Operation is not indicated unless there is demonstrable evidence of inflammation in the abdomen or pelvis, with necrosis or suppuration. Curetting, douches, and examinations, in the acute stage tend to make the disorder worse, and all operations are attended with less risk after the acute stage of an infection has passed. If it is necessary to drain exudates which have broken down, incision should be made outside the peritoneum parallel to Poupart's ligament.

The author is inclined to look upon thrombophlebitis as a conservative process, which should not be carelessly disturbed.

Vineberg¹ contributes a paper describing operations for pyemia by ligating the veins of the broad ligament. After describing the technique, he states that not every case of septic thrombophlebitis is suitable for ligation of the veins. Milder cases with fever from 100° to 103° F. will recover without interference. In 1 case a patient had been curetted, and upon entering the hospital the uterus was not enlarged and the appendages apparently normal. A cord-like structure could be found on the left side of the vaginal vault. At operation, the left spermatic vessels were tied at the pelvic brim, and on the right side the veins and artery also. The median iliac vein on the right side was ligated and a panhysterectomy performed. The blood showed the presence of streptococci. The patient recovered.

The second case was one of infection after abortion, with streptococci in the blood, and ligation of the pelvic veins with hysterectomy. The patient died with pharyngeal diphtheria.

A further case of chorio-epithelioma is reported in which operation was performed, but without result. At autopsy, metastases were found in various organs of the body.

Several other cases are reported in which hysterectomy was performed, with ligation of the veins.

The results are not conclusive as indicating the value of operation upon the veins, especially as in many instances hysterectomy was performed in addition.

THE COMPARISON OF INTRAPERITONEAL AND EXTRAPERITONEAL INFECTION. Schwab² made experiments upon animals to determine whether in cases of operative infection, so severe that they would be fatal if they became intraperitoneal, anything could be done to prevent this result by operating and limiting the infection, if possible, to tissues outside of the peritoneum. He found that there was no appreciable difference between extraperitoneal and intraperitoneal infection, when the infective agent was given in large and fatal doses. In many of these animals there was no evidence that the diaphragm was involved in the localized infective process. The individual reaction of the animal to infection seemed to determine the course of the disease.

THE BATH AS A SOURCE OF INFECTION. Hannes³ examined parturient patients to determine the possibility of infection through bath water. The tub bath was taken in the first stage of labor. In 3 out of 5 patients, bacteria could be identified after the bath, and there seemed to be no doubt that the tub bath was a source of infection, especially in patients who have previously had children, and in whom the birth canal is somewhat dilated. If the head of the child is low in the pelvis in primiparous patients, the pains in the first stage of

¹ Surgery, Gynecology, and Obstetrics, July, 1910.

² Archiv für Gynäkologie, 1910, Band xc, Heft 3.

³ Zeitschrift für Geburtshilfe und Gynäkologie, 1910, Band lxvi, Heft 3.

labor, and pressure, may cause dilatation of the vulva, which will permit the entrance of water.

The severity of the infection following the bath must depend largely upon the cleanliness of the bath tub, the water employed, and of the hospital. There is considerable danger of infection by the hands of those who give the patient baths, especially where the patient bathes herself and no precautions are taken to cleanse her hands.

THE PROGNOSTIC VALUE OF THE PRESENCE OF BACTERIA IN THE BLOOD IN PUERPERAL SEPSIS. Cathala and Guéniot¹ conclude from considerable clinical experience, that reliance cannot be placed upon the presence or absence of bacteria, especially streptococci in the blood in puerperal sepsis. In some instances the blood may remain sterile, although a fatal issue follows; and in others, bacteria are found in cases which ultimately do well.

AUTOINFECTION. Zangemeister² has examined 100 cases of fever in the puerperal period in whom an external cause for infection could not be found, to determine the nature of the infective germ.

In 67 per cent., the streptococcus was present; of these, 43 per cent. were hemolytic, 10 per cent. especially active, and 14 per cent. without hemolytic power. The staphylococcus was present in 14 per cent., and 10 per cent. were hemolytic; the colon bacillus in 2 per cent.; the pneumococcus in 2 per cent., and in 14 per cent. of the cases no definite cause could be found, but probably some infection outside the genital tract was present.

He believes that hemolytic streptococci are present in 75 per cent. of puerperal patients, and that they seem to increase rapidly during the puerperal period from germs originally in the generative tract. There seems practically an equal number of patients having streptococci in those who have been examined, and those who have not been examined. Nine per cent. of these patients examined had fever in the puerperal period, caused by streptococci, and among those who had been examined, 10 per cent. had fever. The source of the streptococci in those not examined was thought to be the tissues of the vulva.

As regards the staphylococci, in patients examined, 77 per cent. had staphylococci, and of those not examined, 69 per cent.; 3 per cent. of the patients who had been examined had fever in the puerperal period caused by staphylococci; while of those who were not examined, none had fever in the puerperal period caused by this germ. Infection transmitted from without is usually more severe than infection originating in the vulvar tissues of the patient.

THE INTRAVENOUS INJECTION OF SUBLIMATE SOLUTION IN PUERPERAL SEPSIS. Polizzotti³ finds that the intravenous injection of sublimate

¹ L'Obstétrique, May, 1910.

² Archiv für Gynäkologie, 1910, Band xcii, Heft 1.

³ Annali di Ostetricia, September, 1910.

solution in puerperal septic cases increases the opsonic index, modifies the virulence of the infective germ, and increases the resisting power of the organism. It stimulates leukocytosis and acts in a considerable degree as an antiseptic.

THE PRODUCTION OF IMMUNITY AGAINST PUERPERAL SEPTIC INFECTION. Czyzewicz¹ reiterates the conclusions drawn from a previous paper,² regarding the value of Rosenberg's phagocytin in producing immunity against puerperal septic infection. He believes that in absolutely clean cases, before each internal examination, a subcutaneous injection of phagocytin reduces the possibility of infection one-half. It also delays the full development of infection. This is true only in those cases in which the cavity of the uterus has not been entered by the hand or instrument. In suspicious cases, with moderate fever, its use seems to be without effect, and the same is true of patients having a considerable rise of temperature.

The results were obtained by observations upon 300 patients, 150 of whom received these injections, and 150 observed as controlled.

Graf³ examined 27 patients to determine the value of nucleinic acid in lessening the morbidity of labor in the puerperal state. The results of his observations were practically negative, as he found that in a critical period of the puerperal state a positive result could not be obtained.

The production of leukocytosis was not such that it could be considered a positive result of the method employed.

THE RAPIDITY OF THE SPREAD OF BACTERIA IN PUERPERAL SEPTIC ENDOMETRITIS. Pankow⁴ has studied 2 cases of puerperal infection to determine the rapidity of the spread of bacteria in endometritis.

His method consisted in opening the abdomen and examining by bacterial methods the various tissues infected. Both cases resulted in recovery.

In the first case, in the extirpated uterus, streptococci had not yet penetrated deeply, and it cannot be denied that the patient might possibly have recovered without operation. When one considers the severity of the symptoms, the infected amniotic liquid, the fact that repeated interference was practised, and the prostrate condition of the patient, it seems more than probable that, in spite of the fact that the streptococci had not penetrated deeply, the patient's life might have been lost.

The second case was operated upon forty-eight hours after delivery, having had a placenta prævia, with the use of the tampon, dilating bag, and version, followed by the development of high fever and endo-

¹ Zentralblatt für Gynäkologie, 1910, No. 41.

² Archiv für Gynäkologie, 1910, Band lxxxix, Heft 3.

³ Zentralblatt für Gynäkologie, 1910, No. 27.

⁴ Ibid., Band lxi, Heft 2.

metritis twenty-four hours after labor. Streptococci were not found in the blood, but the patient was evidently growing worse when operation was undertaken.

In a thrombus taken from the left spermatic vein, streptococci were found as high as the point of ligation. This fact, and the rapid increase in the severity of the patient's symptoms, indicate that prompt operation is essential if operation is to be efficient.

His experience would indicate that in forty-eight hours after the development of endometritis in septic cases, constitutional infection may become well established.

THE PROGNOSIS AND TREATMENT OF PUERPERAL SEPSIS. Jaschke¹ has examined a number of cases of puerperal sepsis to determine the condition of the circulation, and if possible, to base a prognosis upon this fact. He believes that in sepsis, as in many other infectious diseases, the danger of paralysis of the circulation depends largely on paralysis of the vessels of the splanchnic area, and hence the importance of maintaining the circulation by treatment. The degree of paralysis of the splanchnic vessels depends upon the virulence of the infection. In cases which resist infection, this paresis is compensated for by increased action of the heart.

An examination of the blood pressure, and the determination of the character of the second aortic tone, is exceedingly valuable in these cases.

A favorable prognosis may be given in cases in which, in the beginning of the infection, there is no fall essentially in the blood pressure, and where an initial drop in blood pressure through paresis of the splanchnic vessels comes to a speedy termination. When increased heart action with splanchnic paresis restores the blood pressure to normal, it can usually be recognized by the increase in the second aortic tone. So far as the patient is concerned, it seems to make no difference whether this compensation is brought about by a normal power of resistance or by therapeutic measures.

The prognosis is doubtful when blood pressure from the beginning is deficient, in spite of treatment, with irregularity and alteration in the second aortic tone, as during convalescence the character of this heart sound becomes manifestly altered.

A very unfavorable prognosis may be given when there is pronounced blood pressure and alteration in the second tone as well, and especially in all cases in which from the beginning of the disease there is lessened blood pressure, alteration in the aortic tone, and increased heart action which fails to produce compensation. The clinical course of infection does not point so much to the severity of the infection as to the resisting power of the organism.

¹ Zeitschrift für Geburtshülfe und Gynäkologie, 1910, Band lxxi, Heft 2.

Among those drugs especially valuable in sustaining the circulation in infected cases are digitalis, caffein, and adrenalin.

THE DIAGNOSIS AND PROGNOSIS OF PUERPERAL INFECTION. Reibmayer¹ has studied cases of puerperal infection to determine the value of examination of the lochia and the blood in the matter of diagnosis and prognosis. He has applied for this purpose the lecithin test, and finds that this test is not efficient in distinguishing between virulent and saprophytic bacteria in the group of hemolytic streptococci. These germs are, all things considered, the most frequent cause of puerperal infection, and their detection in pure culture in the lochial discharge may be considered a positive diagnostic sign. The fact that they are sometimes obtained in large numbers from patients who are without fever does not militate against this test. Superficial lacerations of the mucous membrane, with abundant secretion and discharge, may bring about their presence without an essential infection. Whether such superficial infection becomes systemic depends upon the sensitiveness and resistance of the infected organism, and also upon the condition and functions of the organ in which infection primarily and most thoroughly develops.

In addition to streptococci, anaërobic germs are often found. Such are much more frequently absorbed after cases of abortion than after infection following normal parturition.

EROSION OF THE VAGINAL PORTION OF THE CERVIX COMPLICATING PUERPERAL CASES. Adair² has studied erosion of the vaginal portion of the cervix in parturient women. He believes that pregnancy is an important factor in the development of such erosions, as they are frequently found in pregnant patients. The injuries caused by labor afford abundant opportunity for infection and the development of erosion. Inflammation is the important element in this condition, to which other conditions are accessory. Round-celled infiltration precedes erosion. The glands of the cervix are especially susceptible to infection, although the fact that infiltration occurs independently of the glands proves that they are not the exclusive source of the infection. The basal layer of the squamous epithelium is the first of the epithelial layers to die as the result of the inflammation. The infection apparently works under the epithelium, producing hemorrhages which separate the epithelium from its supporting tissue. The columnar epithelium of the cervix is of two kinds: a basal epithelium, and a typical cervical epithelium. These are independent so far as their origin and ultimate fate is concerned. A newly formed squamous epithelium spreads outward from the margins of the erosions over the denuded surface. The glands under the squamous epithelium, and under the erosion, come from different sources; some are of congenital origin, while some are

¹ Archiv für Gynäkologie, 1910, Band xcii, Heft 3.

² Surgery, Gynecology, and Obstetrics, April, 1910.

brought into the external position by the eversion and cervical tears present in these cases. When outgrowing glands are shut off, or their openings are plugged, cysts develop. Healing is accomplished by granulation tissue, the epithelium gradually covering the part. Frequently columnar epithelium is found near the external os, as it grows more rapidly than the squamous variety. This, however, has a greater power of resistance, although it develops less rapidly ultimately. It covers the healed tissues. The glands disappear by necrosis; and the gradual obliteration of the columnar epithelium by the squamous variety.

THE HISTOLOGY OF THE CERVIX IN PREGNANCY is treated of at length by Gaifami, Jr., from studies made in Pestalozza's clinic in Rome.¹

His paper is well illustrated by drawings and microscopic sections. He finds that pregnancy causes definite and essential changes in the cervical mucous membrane, resembling the formation of decidua, this change becoming more pronounced as pregnancy proceeds. In 33 per cent. of patients at the fourth month the decidual reaction can be distinctly recognized; in 42 per cent. at the fifth, sixth, and seventh months; and in 55 per cent. at the eighth month.

This reaction is a little more frequent in multiparous patients than in primiparous women. Should the process exceed its physiological limits it may cause ectropion, erosion, cervical polyp, or cancer. The changes are seen most pronouncedly in the stratification of the epithelia, the alterations in the glands, the growth of pavement epitheli, and the formation of protoplasmic masses in the trabeculae of the connective tissue. Glandular changes appear about the fourth month, are well pronounced from the fifth to the seventh, and plainly to be demonstrated by the eighth month.

One can, from these studies, readily understand the frequent development of cancer from the changes produced in the cervix by pregnancy.

OBSTETRIC SURGERY

The Opening of the Cervix by Bossi's Dilator and by Vaginal Cesarean Section. Weischer² reports the results of these methods of treatment in Olshausen's clinic in Berlin from 1905-10, inclusive.

In using Bossi's dilator, the patient is placed across a bed and anesthetized. The anterior and the posterior lips of the cervix are grasped by a tenaculum forceps, and under the guidance of the hand a speculum is introduced within the vagina. A Bossi-Frommer instrument is then introduced into the cervix and separated as quickly as the resistance of the tissues will permit. Two blades of the instrument are then removed,

¹ *Annali di Ostetricia*, 1910, No. 7.

² *Zeitschrift für Geburtshülfe und Gynäkologie*, 1910, Band lxvi, Heft 2.

and an effort is made to complete the dilatation by hand. Irrigation is next practised by a 1 per cent. sodium solution, and the instrument rotated, and dilatation further performed with the control of the hand until the cervix is as large as a 5-mark piece—about the size of a silver dollar. The instrument is then withdrawn; the two branches first removed are re-inserted, and the cervix again dilated gradually until the tenaculum forceps can be removed, and the dilator with all its branches introduced for final dilatation.

Seventy-one cases are reported—53 primiparæ and 18 multiparæ; in 45 cases the cervix was obliterated; in 20 completely, and in 25 more or less obliterated. In 21 cases the cervix was present, being complete in 12, partially complete in 9; in 5 cases there is no note on this point. The size of the cervix varied considerably at the beginning of the dilatation, and the scale at the completion of dilatation registered from 5.25 to 12.5 mm. The time occupied in dilatation varied from twenty-two to ninety minutes, the shortest period in one case being fifteen minutes.

Among the primiparous patients, more time was occupied in dilatation than in multiparæ, the relative proportion being in primiparæ 34.4 minutes to 23.7 minutes; in multiparæ the average for all cases was 32.5 minutes.

The indications for the operation were eclampsia in 62 cases, abortion in 2, premature separation of the placenta in 2, prolonged labor, edema of the lungs, and obstruction by scar tissue in 1, placenta prævia and heart lesions in 1, uremia and premature separation of the placenta in 1. In 39 cases, the child was delivered by version and extraction; in 26, by forceps; in 3, by version; in 2, an attempt at forceps was followed by perforation and cranioclasia, and 1 by version and craniotomy on the aftercoming head; in 1, by traction upon a foot; and in 1 case, after the forceps had failed to deliver, version and extraction succeeded.

The puerperal morbidity from fever was 22.5 per cent. Six of these patients had fever before labor; of the 16 cases of morbidity through fever, 13 recovered, 3 ended fatally; 2 had prolonged coma after eclampsia, 1 of them finally dying of embolism; 18 of the mothers died, 15 from eclampsia, 1 from atony, 1 from embolism, and 1 from hemorrhage from a laceration which occurred at the birth of the child. This maternal mortality is credited to 71 operations. Among the children, 29 perished—17 during labor, 1 with placenta prævia, 1 by craniotomy, 4 were premature, and 7 perished before delivery. Of the 29 cases, 18 must be credited to the operation itself.

As regards lacerations of the cervix produced by Bossi's dilator, every precaution was taken to recognize such an injury by examining the cervix each time when the dilator was removed. It was often possible to tell whether lacerations occurred from the use of the dilator,

or the subsequent delivery. Small lacerations which did not bleed were not sutured. There were 23 cases of lacerations which could be distinctly traced to the dilator, and, of these, 14 were immediately repaired. Among these cases, 6 had fever during the puerperal period. Of the 23 cases, 17 recovered, those who died perishing in eclampsia, coma, and embolism. There were 4 cases in which injury to the cervix could be distinctly traced to the delivery of the child, and these were immediately repaired; 2 of these died—1 from eclampsia, and 1 from hemorrhage. In 6 cases, it was impossible to tell just when and why laceration occurred; 5 of these were sutured, of whom 3 recovered; 3 of the 6 cases died, 2 of eclampsia, and 1 of hemorrhage.

It is further important to observe that the use of Bossi's dilator can be followed by complications in the third stage of labor. In 4 cases—5.6 per cent.—it was necessary to deliver the placenta by the hand.

An additional report of 11 cases of dilatation by the Bossi instrument in polyclinic practice is also given. Among these mothers none died; 2 children were born dead before labor; and 1 died during labor. Lacerations occurred four times and were immediately repaired.

Vaginal Cesarean section was compared with dilatation by the Bossi instrument. The method employed was narcosis with the patient across a bed or table, and the grasping of the anterior lip of the cervix by a stout tenaculum forceps. A transverse, slightly convex incision was then made across the anterior vaginal wall, and the urinary bladder separated and pushed up. The anterior lip of the cervix was then grasped by two tenaculum forceps, the cervix split anteriorly in the median line to the internal os, and delivery undertaken. The incisions were immediately closed so soon as the uterus was empty.

There were 45 vaginal Cesarean sections—36 among primiparæ, and 9 among multiparæ. The average duration of the operation was thirty-one minutes, the indications being eclampsia, placenta prævia, and heart lesion, and premature separation of the placenta. Delivery was accomplished by version in 37 cases, by forceps in 4, craniotomy in 2, version and extraction and perforation in 1, and by the induction of premature labor, and there was 1 case of premature labor.

The morbidity in the puerperal period was higher by dilatation than by Bossi's dilator; 14 of the 45 patients had fever, 4 of them being eclamptic patients. One patient had fever because of thrombosis; 6 mothers died of eclampsia.

The mortality among the children was 13 out of 45, of whom 7 were dead before the operation, and 3 were premature. In 3 cases, the incisions were enlarged by the extraction of the child, and in 1 case the muscular layer of the bladder was wounded. No harm followed this accident.

The puerperal period was abnormal in 7 cases, the introduction of the hand being required to bring away the placenta.

When the results of both operations are critically compared, and those cases are excluded which seem misleading, the maternal mortality with the use of Bossi's dilator was 25.3 per cent.; with vaginal Cesarean section, 23.3 per cent.; while the fetal mortality with Bossi's dilator was 40.8 per cent. and by vaginal Cesarean section, 28.8 per cent.

Olshausen compares the results of investigations by Gauss, formerly connected with his clinic. In that period there were 65 cases from the use of Bossi's dilator, with a maternal mortality of 15 or 12 from eclampsia, 1 from heart lesion, 1 from sepsis, and 1 from anemia. The statistics in detail do not differ essentially from those already quoted.

Dührssen's method of vaginal Cesarean section has been tried by Jeannin and Garipey.¹ The paper gives a report of cases in detail with drawings illustrating the field of operation. The recent literature is reviewed. Multiple incisions in the cervix have the merit of simplicity, and do not, as a rule, tear and extend into important tissues. One can use this method equally in cases where the cervix is, or is not obliterated, as the incisions are limited to the vaginal portion. When such incisions are not sufficient, vaginal Cesarean section should be practised, but it is a more complicated procedure, requiring section through very vascular tissues. These procedures are indicated in cases in which the uterus must be quickly emptied, and also in cases in which there is rigidity of the cervix, spontaneous dilatation will not be expected. Care must be taken to limit the operation to those cases in which the child is not unusually large. It is generally better to employ anterior and posterior colpotomy followed by anterior and posterior hysterotomy.

The Forceps. THE TECHNIQUE OF FORCEPS DELIVERY. McDonald² contributes a paper illustrated by photographs showing the method of retaining the patient in the proper position on a table, the arrangement of the material for asepsis, a sling for supporting the legs, and the use of the solid bladed forceps. He believes it is always advisable to remove the instrument before the delivery of the head to lessen the danger of laceration.

Cesarean Section. The rapid growth of obstetric surgery is indicated by the fact that during the past year but few papers have appeared upon older methods of delivery. Section of the abdomen, vaginal section, and pubiotomy, are the operations to which the most study and attention are given.

The indications and technique of vaginal Cesarean section are considered by Stowe.³ He gives a good description of the operation, drawing attention to the necessity for manual dilatation of the vagina and pelvic floor before operating. It is well to secure some dilatation of the cervix to make free drainage of the lochia. The vaginal mucosa

¹ *L'Obstétrique*, November, 1910.

² *American Journal of Obstetrics*, February, 1910.

³ *Surgery, Gynecology, and Obstetrics*, December, 1910.

is incised by a T-shaped cut, the long portion extending from a point 2 cm. below the urethral orifice to a short distance above the external os. The transverse portion is about 5 cm. in length. The bladder is separated, the dissection being carried laterally for a short distance on each side in the direction of the broad ligaments. The bladder is protected by an anterior retractor, and the flaps are held asunder by forceps. The cervix is split in the median line by scissors, the length of the incision depending upon the duration of pregnancy, the size of the fetus, and the degree of dilatation present. It usually measures from 5 to 9 cm. The forceps holding the flaps are replaced by silk sutures. Delivery is performed by rupturing the membranes, version, and extraction. If the head is easily accessible, it may be delivered by forceps. The placenta is removed manually and the uterus massaged, and, to control hemorrhage, is packed with a long strip of gauze. When the bleeding is controlled, the anterior uterine wall is pulled down until the upper angle of the wound is reached, and the tissues closed by continuous catgut. The vaginal wounds are repaired by interrupted catgut, and a small drain inserted into the vesico-uterine space, being allowed to remain for twenty-four hours. If a posterior incision has been made, it is first closed by continuous catgut through the entire wall, the vaginal mucous membrane being brought together by interrupted catgut.

Rosenfeld¹ has found 53 cases of vaginal Cesarean section reported in the Russian literature of obstetrics.

His first case was terminated by craniotomy, as the head was inaccessible and could not be delivered by forceps without seriously tearing the mother.

In the second case, he could easily deliver a six months' fetus. Both operations were performed for eclampsia. The mothers recovered.

The majority of Russian obstetricians believe that the operation has a definite but limited field. Bumm's method of anterior vaginal hysterotomy is considered the most simple, and is employed in most cases. The operation is preferred to the more tedious and uncertain method of dilating by bags.

Dührssen² writes in explanation and defence of his operation, and would combine the advantages of dilatation with bags by using the bag first, and then proceeding to deliver by vaginal Cesarean section. He reports 42 recent cases, with 4 deaths, none of which could be justly assigned to the operation.

VAGINAL CESAREAN SECTION COMPLICATED BY APPENDICITIS. Marschner³ reports the case of a primipara, aged twenty-nine years, who, at the end of her pregnancy, was suddenly taken with distention

¹ Zentralblatt für Gynäkologie, 1910, No. 49.

² L'Obstétrique, November, 1910.

³ Zentralblatt für Gynäkologie, 1910, No. 4.

of the abdomen, tenderness, and pain. No dilatation of the cervix and no evidence of beginning labor was present. In the right lower abdomen there was increased resistance and pain. During the next twenty-four hours the patient had a chill, vomiting, and high pulse, when the fetal movements ceased.

A diagnosis of fetal death, and acute appendicitis was made, and the patient transferred to the hospital. Considerable difficulty was found in opening the cervix, and Bossi's dilator was employed, and the head of the child perforated. The child was delivered with considerable difficulty. The afterbirth was immediately removed, and the uterus irrigated. The incisions were closed by sutures.

The operation consumed about two hours, and it was necessary to wait until the following morning, when it was hoped that the patient would be in a condition for operation; but at that time symptoms of pulmonary infection had developed. Five days after delivery the abdomen was opened, a gangrenous appendix removed, and a large abscess drained. It was necessary to use drainage through the abdominal wall and through the vagina as well.

The patient gradually recovered, and the drainage tract finally closed.

VAGINAL CELIOTOMY IN ECTOPIC GESTATION. Jacobsohn¹ gives the results of vaginal operations for ectopic gestation in Ott's clinic in St. Petersburg.

In the last nine and one-half years, by the use of electric lighting of the abdomen, 103 vaginal sections were performed without a fatal issue. The operation is performed by placing the patient in the dorsal position, and, after preliminary disinfection, the cervix is pulled downward and the posterior vaginal tissues freely incised. When the abdominal cavity is opened, the edges of the wound are sutured very thoroughly. The ends of the ligatures are left long, and gathered in a knot. The adhesions are then separated, the extravasated blood removed, the patient's pelvis raised, the shoulders lowered, and Ott's electric speculum is introduced, lighting up the pelvic and abdominal cavity. The abdominal viscera gravitate toward the diaphragm and the field of operation can be plainly seen. The separation of adhesions by cutting, or by the Paquelin cautery, the removal of tumors, and the loosening of scar tissue, can be carried out as plainly as by abdominal section.

In 2 cases the superficial tissues of the rectum were slightly wounded, but these were closed at once by suture. From ten to fifteen minutes is occupied in the average operation. In all, 107 cases were so treated without mortality, and with excellent results.

The same method of treatment for other conditions is described from the same clinic by Kiparsky and Korobkoff, who reported 12 vaginal ovariectomies performed during pregnancy for cystic tumors. Abortion

¹ *Monatsschrift für Geburtshülfe und Gynäkologie*, December, 1910, Band 32.

occurred in 2 cases, and 1 death occurred from septic peritonitis in a patient having a dermoid cyst in the pelvis.

Markowsky and Preobrajenski contribute papers upon the same subject, describing cases of disease of the tubes and ovaries operated upon by this method.

Werboff and Sitzinsky write concerning the treatment of carcinoma of the uterus and the illumination of the uterine cavity by the electric light in Ott's clinic.

In concluding this series of papers, Ott sums up the advantages which this method affords.

TRANSPERITONEAL CERVICAL CESAEREAN SECTION. Richter¹ reports 12 cases of transperitoneal Cesarean section in Leopold's clinic at Dresden. The various methods of performing cervical section by Sellheim and Latzko, and the transperitoneal method, were employed, as the needs of each case indicated. In extracting the child, a small forceps by von Boerma, of Holland, was employed to advantage. One mother died on the third day after operation from purulent peritonitis originating in the laparotomy wound. The membranes had ruptured sixteen hours before operation, and the patient had been examined once by a physician and three times by a midwife. The patient had profuse hemorrhage during delivery. The other patients made complete recoveries, and there was no mortality among the children following the operation. In 1 case, the child was dead from prolapse of the cord, the mother's pelvis being contracted before she was admitted to the hospital. There were no injuries to the bladder or ureters.

All of the patients were admitted to the hospital after they had been long in labor, and after the membranes had ruptured and the patient had also been examined by midwives. In 5 cases, there was profuse hemorrhage when the uterus was opened. The delivery of the child was often difficult, owing to the very small space available for the extraction of the head. The longer the labor and the greater the caput, the greater was the difficulty. In 1 case version was performed, and in the case of a dead child the head was fixed by forceps and perforated. The operation consumed forty-five minutes, and the delivery of the child from ten to fifteen minutes; while abdominal Cesarean section does not require more than thirty minutes, and two minutes for the delivery of the child.

His experience does not lead him to believe that this method will supersede the classic abdominal Cesarean section.

Leopold, from 300 Cesarean sections, states his belief that the classic abdominal Cesarean section is the best operation for the mother and child, and that it will not be superseded by other methods. In 303 operations, 8 cases were infected before operation. This leaves 295

¹ Archiv für Gynäkologie, 1910, Band xci, Heft 2.

operations of all sorts, with 10 deaths—a mortality of 3.3 per cent. Of these 210 classic Cesarean sections, there were 9 deaths—a mortality of 4.2 per cent.

For comparative purposes, he selects 214 classic Cesarean sections, 12 extraperitoneal sections, and 85 pubiotomies. In his last series he has had 64 consecutive classic sections, without a death. His entire mortality from these operations for the mothers is 1.2 per cent. Of the 214 mothers all the children were born living.

He believes that to secure such results care must be taken in selecting and preparing the cases. He believes that patients should be admitted to hospital two or three weeks before operation, examined as little as possible, and that if the patients come into the hospital in labor, those cases subjected to classic section must not have fever, and the heart beats of the child must be good.

He would not decline operation because meconium had been expelled, or because the cord had prolapsed. The premature rupture of the membranes is important as indicating possible infection.

In each case, the secretion of the urethra, the cervix and the vagina, is examined, especially for gonococci. Several times, in gonorrheal cases, stitch-hole abscess occurred, and the uterine stitches worked out through the abdomen. In one case of gonorrhea, the patient died after operation from endometritis and peritonitis. If the child is living and in good condition, even though the mother has gonorrhea, he would choose classic section above pubiotomy and the extraperitoneal method. The operative material is divided, the chief of the clinic taking two-thirds of the cases, and the assistants one-third. The technique is thoroughly defined and absolutely followed.

He ascribes great importance to the prevention of hemorrhage by the application of a rubber band around the cervix, and the hypodermic injection of ergotin into the thigh. The bandage is removed so soon as the deep stitches of the uterine muscle are inserted, and is in position so short a time that it does not cause atony. The uterus is removed from the abdomen, the abdominal walls temporarily closed so that the intestine is not seen, and blood and amniotic liquid are kept out of the abdominal cavity.

Great importance is laid upon a perfect narcosis during operation. The closure of the uterine muscle is done by silk or cumol catgut. Silk is the best possible material. To avoid intestinal complications, the precaution is taken to remove the intestines from the pelvis before replacing the uterus after the operation. All clots are removed from the cervix and vagina by vaginal irrigation of 2 per cent. carbolic acid, followed by sterile water.

He compares 3 operations in parallel columns in detail, and warmly recommends the classic Cesarean section in clean cases, and the Porro operation in infected cases.

THE UTERINE SCAR IN CORPOREAL AND CERVICAL SECTION, AND THE QUESTION OF RUPTURE IN SUBSEQUENT LABOR. Scheffzek¹ reports the case of a patient upon whom he had previously done the classic Cesarean section, from which the patient's recovery was complicated by stitch-hole abscess. The patient was admitted in labor much exhausted, the uterus was very tender, and the abdomen greatly distended. The patient seemed shocked and very anemic, and was vomiting greenish, thin material. Upon opening the abdomen, the uterus was found to have ruptured, the child was macerated, the muscular tissue of the uterus pale and relaxed, and the intestines distended. The uterus had ruptured through the whole length of the former scar.

Upon examination, it was found that only the serous coat of the uterus had united after the first operation, and that rupture had occurred because of the distention of the uterus as pregnancy increased. The patient died on the following day from acute anemia, and upon examination it was found that a ligature had slipped from an artery, which was followed by fatal hemorrhage.

Scheffzek has performed extraperitoneal section ten times with good results. His conclusions are in favor of the transperitoneal section as giving the better scar with less danger of subsequent rupture.

TWO CASES OF CESAREAN SECTION WITH UNCOMMON COMPLICATIONS. Sitzenfrey² reports an abdominal Cesarean section with sterilization by removal of the tubes for dystocia, following a firm vaginal fixation of the uterus. The patient suffered from suppurative peritonitis caused by the streptococcus mucosus and staphylococcus pyogenes aureus. It was necessary to open the abdomen the second time to loosen adhesions and to insert drainage. The patient's recovery was complicated by an intestinal fistula, which gradually closed. The child made a good recovery.

The second case was that of contracted pelvis with stricture of the vagina, and infection of the uterus from premature rupture of the membranes. Purulent discharge was present, which had collected above the point of stricture. Cesarean section was followed by total extirpation of the uterus, during which the left ureter was accidentally ligated, and the right ureter compressed by a kink between the peritoneum at the upper portion of the vagina and the bladder.

The abdomen was reopened, the left ureter implanted in the bladder, and the right one freed. The patient made a good recovery, her child recovering also.

TRANSPERITONEAL SECTION FOR FACE PRESENTATION AND THREATENED UTERINE RUPTURE. Gerstenberg³ reports a case of face presentation with posterior rotation of the chin delivered by transperitoneal section.

The child was 54 cm. long, weighed 8 $\frac{1}{4}$ pounds, was asphyxiated at

¹ Zeitschrift für Geburtshilfe und Gynäkologie, 1910, Band lxxvii, Heft 3.

² Ibid., Band lxxvi, Heft 3.

³ Zentralblatt für Gynäkologie, 1910, No. 41.

birth, and was resuscitated with great difficulty after three-quarters of an hour's work. Considerable mucus was removed from the trachea and pharynx, which smelled strongly of ether.

THE HISTORY OF EXTRAPERITONEAL CESAREAN SECTION. Döderlein¹ reviews the history of extraperitoneal Cesarean section. He describes Ritgen's operation (October, 1821), which might have been successful had not after-treatment with poultices been employed, which produced fatal postpartum hemorrhage.

In 1825, Physic and Horner, from dissection, considered the method possible but scarcely practicable. In 1870, Thomas published an article advocating the operation by his method, which consisted in dilating the cervix with the hand, making an incision from the symphysis to the right anterior superior spine and down to the peritoneum, which he separated and pushed upward. He then exposed the cervix and vagina, and cut through the vaginal wall upon a sound introduced into the vagina, and held by an assistant. The cervix was drawn through this wound into the external wound by means of a blunt hook. The fetus was then extracted.

His first case was that of a woman in eclampsia, who died, with her child, shortly after the operation. He then successfully operated upon a primipara, aged twenty years, with highly contracted pelvis. Skene, in 1876, reported 2 successful cases. In 1878, the American Gynecological Society reported favorably upon the operation, which had been designated laparo-elytrotomy. Up to 1880 there had been reported 8 cases of extraperitoneal Cesarean section, of whom Thomas had 2, Skene, 3; Gilete, Hime and Edis, each 1 case. The mortality rate of the mothers reached 50 per cent.; the children 42 per cent. The bladder was wounded in 6 cases. A few additional cases were collected with the same mortality. If, however, the cases were closely analyzed, and those unfavorable for any surgical procedure were excluded, the mortality of the operation itself fell to *nil*.

Thomas' method was taken up by Frank in 1881, by forming a tent of peritoneum by suturing the round ligaments to the abdominal walls and making the uterine incision low down. This proved too complicated. In 1907 Frank devised a method by transverse incision above the pubis, opening the peritoneal cavity, loosening and stitching the vesico-uterine fold to the parietal peritoneum, incising the uterus transversely, and allowing the fetus, if possible, to be delivered spontaneously through this channel. After the uterus had been emptied its wound was closed by catgut in clean cases, and left open for iodoform gauze drainage in infected cases. The iodoform gauze drain was passed from the uterus through the vagina.

Frank had 13 cases, with no death. Frommé and Veit further used and modified this operation. Sellheim then proposed a modern extra-

¹ Surgery, Gynecology, and Obstetrics, January, 1910.

peritoneal section, his operations approaching more the method of Frank. Latzko and Döderlein, by loosely distending the bladder with 150 c.c. of water, avoided its injury, and delivered the child through a median sagittal incision in the cervix.

The modern operation is still on trial, but it seems fair to give the credit for the original study which made the operations possible, and its successful application, to Thomas.

CESAREAN SECTION FOR UMBILICAL HERNIA. Carstens¹ reports the case of a multipara with a very pendulous abdomen and large umbilical hernia, through which the uterus projected. The cervix was very high up, and the vagina seemed a long thin tube, through which delivery could not be effected. She was admitted to the hospital in labor, the fetus having died.

Upon opening the abdomen, the entire uterus was in the hernial sac. The uterus was emptied after incision, sutured, and the hernial sac repaired as far as possible, the patient making a good recovery.

CESAREAN SECTION FOR IMPASSABLE CONTRACTION RING. Dickinson² draws attention to the contraction ring, which is the lower edge of the muscle of the body of the uterus in labor. Its presence results from normal activity in excess, and unbalanced development may constitute a slight or serious obstruction to labor. The physiological contraction ring is the lower boundary of the uterine muscle, in action curving under the presenting part, or fitting into a depression during contractions and disappearing later in labor. The ring becomes contracted when hour-glass uterus develops with increased tension and resistance, and shortening and thickening of the entire wall of the body of the uterus. When the uterine muscle becomes tetanic, the ring is a girdle in continuous spasm. One-third of the mothers and one-half of the children in the reported cases have died. If the child is dead, it can usually be delivered by giving the mother morphine to relax the spasm, followed by complete ether narcosis, with extraction by forceps, version, or embryotomy. In some cases, it may be safer for the mother to perform section. If the child is living, an attempt should be made to dilate the ring and deliver the child by forceps or version. Should this fail, embryotomy will usually be chosen. When mother and child are in fair condition, and infection is not probable, if the ring does not yield to morphine, ether, manual dilatation, and traction, Cesarean section may be undertaken.

Six cases of section for contraction ring are reported; 3 of the 6 mothers died, and 2 children survived, who were living when the operation was undertaken.

Dickinson reports a successful case, and also cites one by Holden, and one by Watt, of Brooklyn. He believes that ordinarily in these

¹ American Journal of Obstetrics, January, 1911.

² Surgery, Gynecology, and Obstetrics, October, 1910.

cases without operation the mortality would be more than 33 per cent., and the infant mortality at least 50 per cent. In all, he has collected from the literature 74 cases of contraction ring, with 14 maternal deaths. In his own experience he has met with this complication seventeen times, with the death of no mother.

SUPRASYPHYSEAL SECTION. Lange¹ reports the results of 15 suprasymphyseal sections in his clinic in Posen. Five of these were transperitoneal and 10 were extraperitoneal, by Latzko's method. Of the latter, but six were carried out in a typical manner. In 2 cases, the peritoneum tore as it was being pushed upward, and the operation was then made a transperitoneal one. In 2 cases, the relations of the bladder were such that Latzko's method could not be typically carried out. In one patient, although 280 c.c. of fluid were injected into the bladder, it could not be brought above the symphysis. It remained in the right half of the small pelvis beneath the head, which was firmly pressed down by the pelvic brim. Labor had persisted thirty-six hours, but the bladder had not freed itself from pressure.

In the second case, after the injection of the fluid, but a very small portion of the bladder was above the symphysis. Labor had lasted for twenty-six hours after the rupture of the membranes, and the head was forcing the bladder down at the pelvic brim.

In both cases, the presentation was that of a posterior parietal bone.

In a third case of a similar nature, twenty-three hours in labor, the bladder could be brought above the pelvis and Latzko's method could be carried out in a typical manner. In 3 of these cases, the operation was done for eclampsia; in one case for contracted pelvis, making vaginal section impossible; in a second case excessive edema of the external genitals, obliging the surgeon to open above; and in a third case vaginal Cesarean section would have required large incisions in the vulva and vagina.

In these 3 cases, the suprasymphyseal method was successful.

In 12 cases, the indication was contracted pelvis, uterine rupture threatening one patient, and the fetal heart sounds showing dangerous birth pressure in 3 cases. In the remaining 9 cases, the indication was the mechanical obstruction to labor which the contracted pelvis occasioned. The impossibility of spontaneous labor was shown in these patients by the actual test of labor pains. The shortest period elapsing before operation was five hours, in a patient with highly contracted pelvis who had lost four children previously by craniotomy. In the other cases, the period of labor lasted for from twenty-two to sixty-six hours. Placenta prævia was not considered an indication for suprasymphyseal section. But four of these patients were in the hospital at the beginning of labor. The remainder had been examined before admission.

¹ *Monatsschrift für Geburtshilfe und Gynäkologie*, 1910, Band xxxi, Heft 5.

So far as the results are concerned, one patient with eclampsia had pulmonary embolism in the third week of the puerperal period, but recovered; a second case of eclampsia developed mania and was transferred to the wards for nervous diseases, where she afterward recovered. The remaining 13 made good recoveries.

The puerperal period was complicated by fever in most of the patients, and in 3 by a temperature reaching 104° F. Two of the cases were discharged on the twenty-sixth day, and one on the eighteenth; the remainder from the seventeenth to the twenty-eighth day after the delivery of the child. In one case, the discharge from the hospital was somewhat delayed by failure in primary union in the abdominal wound. In one case there was injury to the bladder, which was slight, and not influencing the patient's recovery. The bladder was accidentally included in a stitch which had to be cut out, leaving a small wound. The bladder was sutured, and a permanent catheter used with a good result.

Among the children, 11 were born in good condition, and 4 asphyxiated; 3 of the latter were speedily revived, but one could not be rescued; one of the asphyxiated children had hydrocephalus. Its extraction was somewhat difficult, but the incision was not torn by the delivery. This child died twenty-four hours after delivery from convulsions. The remaining 13 did well.

In Lange's experience, both transperitoneal and extraperitoneal section did equally well. He calls attention to the fact that in the transperitoneal method it is possible to so pack the wound with gauze that the intestines do not become visible and are in no danger of injury. In Latzko's method, he considers it of importance to use preliminary distention of the bladder to locate this viscus, although the bladder should be opened just before the uterus is opened. The Nélaton catheter is used, and closed with a clamp forceps. Upon removing the clamp the bladder can be emptied whenever the operator desires. In order to free the uterus, it is necessary to divide the lateral ligaments of the bladder. In delivering the placenta, sufficient time should be taken to secure a result by Credé's method. Manual delivery of the placenta should be avoided, if possible.

None of these patients at their discharge showed an abnormal fixation of the uterus. He does not believe that there is essential danger of uterine rupture in these cases should spontaneous labor subsequently develop.

THE VALUE OF THE CLASSIC CESAREAN SECTION. Schauta¹ reviews his experience of the various methods of section and hebosteotomy, and concludes as follows:

In all cases in which spontaneous birth cannot occur, if the child is living and in good condition and disproportion exists, the mother

¹ Monatschrift für Geburtshülfe und Gynäkologie, 1910, Band xxxi, Heft 1.

being uninfected and the disproportion considerable, in primiparous patients the classic Cesarean section is to be chosen. In multiparous patients, classic Cesarean section; or, if the conditions are favorable, hebosteotomy. In cases that have been long in labor, and with abnormal mechanism and in which the uterus may have become infected through premature rupture of the membranes, in primiparous patients extra-peritoneal section and drainage should be employed; and in multiparous patients, hebosteotomy. In cases probably infected, craniotomy should be performed, or possibly Sellheim's method of suprasymphyseal delivery, followed by the formation of a uterine abdominal fistula. When pelvic contraction is considerable and great disproportion exists, the classic Cesarean section should be chosen for clean cases. For those complicated by long labor, extraperitoneal section and drainage, and for infected cases, the Porro operation, and total extirpation or delivery by Sellheim's method for utero-abdominal fistula.

REPEATED CESAREAN SECTION. Meyer¹ reports 2 cases of repeated Cesarean section. The first was operated upon in 1898 for contracted pelvis by Fritsch's transverse fundal incision, the uterus being closed with three layers of catgut prepared in carbolic acid and alcohol. The patient had a slight rise of temperature during her recovery.

In the repeated section in 1902, it was found that the uterine scar had ruptured, that placental tissue protruded through the point of rupture, and that there had been some hemorrhage into the abdominal cavity.

The second patient was operated upon first in 1898, for a tumor in the pelvis obstructing labor. This tumor had its origin at the sacro-iliac joint. A transverse incision of the fundus was made, and carbolic acid and alcohol catgut used in closing the uterus. Seven years afterward an effort was made to remove the tumor, which then reached the umbilicus. It was found to have its origin from the sacrum and to have extended between the mesentery and the mesocolon. The base of the tumor could not be removed.

An examination showed the growth to be a spindle-celled sarcoma. Pregnancy followed two years later, and when the abdomen was opened blood was found in the peritoneum which had escaped from the uterus through an aperture in the anterior wall. Supravaginal amputation of the uterus was then performed. The placenta had developed along the posterior wall of the uterus. The patient's puerperal period was normal.

RUPTURE OF THE UTERUS AFTER CESAREAN SECTION. Dahlmann² adds 3 cases to those already collected of 26 cases. His first case was that of a patient who was first operated upon for a myoma of the cervix, the uterus being opened by transverse incision, the myoma

¹ *Monatsschrift für Geburtshülfe und Gynäkologie*, 1910, Band xxxi, Heft 3.

² *Ibid.*, Band xxxii, Heft 1.

removed, and the uterus closed with catgut. About a year afterward the patient was brought into the hospital in collapse, having come into labor after normal pregnancy, and labor ceasing with violent pain and shock. Upon section there was considerable blood in the abdomen, and on the left side of the fundus a rent 15 cm. long and $7\frac{1}{2}$ cm. wide. In the tissue could be found several knots of catgut. The omentum was adherent to the uterus.

Upon microscopic examination, the muscular tissue had been greatly thinned, and where the omentum had become adherent to the uterus very little muscular fiber was found. At the point of rupture fibrous tissue only was present in the uterine wall. The same condition was observed in other portions of the uterus, and the process seemed to be one of muscular atrophy, most pronounced where the omentum was adherent. The case terminated fatally.

It is interesting to observe in this case the use of catgut in closing the uterine incision.

A second case was that of a patient operated upon for varicose veins of the vulva, which were so large as to make vaginal delivery exceedingly dangerous and practically impossible. The uterus was opened by transverse incision, and silk was used to close the uterine muscle. The stitches were passed through the decidua and serous surface of the uterus. A portion of the uterus was fastened to the abdominal wall. The patient afterward reported with a utero-abdominal fistula, which subsequently healed.

She afterward came into hospital in a pregnant condition, stating that the uterus had ruptured three days previously without known cause. Fetal movements could not be felt. There was constipation present, and the fetus could be plainly palpated through the abdominal wall. There were no heart sounds, dullness in the lower portion of the abdomen, and the cervix was closed. Upon section, it was necessary to separate the omentum from the uterus. The fetus and placenta had escaped from the uterus, and the uterus was tightly contracted. Across the fundus was a wide laceration from which slight hemorrhage occurred. There was considerable blood in the abdominal cavity. Supravaginal amputation was performed, the patient making a good recovery.

Upon microscopic examination, the uterine scar was found to consist of connective tissue, with a considerable deposit of fat in place of the uterine muscle. The uterine decidua was very thin at this point. Hemorrhage had occurred into the decidua. There seemed to have been, in several places, practical fusion of the decidua and peritoneum, with an absence of muscular tissue. In some places, the muscle had developed poorly, and stained poorly with reagents.

His third case was that of a patient with contracted pelvis operated upon by section, with transverse incision, the uterus being closed with

catgut. The patient again came to the clinic and was operated upon as soon as labor developed. At the fundus was found an opening into the uterus as large as a silver dollar, from which no blood escaped, the opening being in the middle of the scar. The membranes protruded somewhat through the opening. There was blood in the abdominal cavity. The omentum, uterine scar, and anterior abdominal wall were adherent. The uterine scar was exceedingly thin, and the placenta developed posteriorly on the left side of the fundus. The old scar was dissected out, and also the point of entrance to the Fallopian tubes, and the uterus and abdomen closed. The patient's recovery was complicated by thrombosis in the left leg, from which she made a good recovery. Upon her discharge, the uterus was anteverted and adherent to the abdominal wall.

Dahlmann publishes brief notes of 23 other cases which he has collected from the literature. In 22 cases, the uterus was opened; in 10, in the median line; and in 12, by transverse incision at the fundus.

The writer is not disposed to place stress upon the character of the suture material employed. Most of the cases, however, were those of rachitic pelvis in which the rachitis may have influenced the condition of the mother's tissues. In 17 of these patients, the mother nursed the child. The insertion of the placenta and its attachment to the uterine scar seem of great importance. In 9 of the cases collected, the placenta was attached to the uterine scar.

It seems also a fact of much importance that the uterus should undergo perfect involution after operation, and that the puerperal period should be free from fever. The occurrence of utero-abdominal fistula, which interferes with the development of the uterine muscle, will predispose to rupture in a succeeding pregnancy. Inflammation and adhesions of the mesentery to the uterine scar, and any inflammatory change in the uterus which causes the development of connective tissue and prevents the formation of healthy muscle, predisposes to rupture. If the uterine wound does not heal by first intention, connective tissue is formed, and if this extends to the peritoneal covering a thin and inefficient scar is inevitable. In some cases, the growth of villi of the chorion from the decidua into the scar may undoubtedly be a factor in causing rupture.

Of the 23 cases which he collected, 20 mothers recovered after rupture of the uterus—a mortality of 13 per cent. When these cases were treated by the tampon, the mortality was 16.7 per cent. The mortality for the children was 77.5 per cent. In 3 of the cases, uterine rupture was not diagnosticated before the second operation.

Attention is called to the possibility of rupture of the scar in vaginal Cesarean section, and Labhardt's case is quoted. The mortality in these cases seems to depend, not so much upon the existence of rupture as upon the promptness with which the second operation is performed.

All patients having had Cesarean section are returned to the hospital for their confinement should pregnancy again occur.

In the greater portion of these cases, rupture occurs in the last month of gestation, and during this time the patient should be under constant observation.

THREE CASES OF CESAREAN SECTION; ONE REPEATED OPERATION FOR PERITONITIS FOLLOWING A FORMER SECTION. Flesch¹ reports the case of a patient delivered by section for pelvic abnormality by transverse incision of the fundus, the child being hopelessly asphyxiated. On the second day after the operation, the patient had an attack of peritonitis, followed by opening of the abdominal wound, and very gradual recovery. The abdominal wound was again closed with silver wire, the patient making a very good recovery.

In her second pregnancy, the operation was complicated by adhesions between the fundus of the uterus and coils of the intestine. It was impossible to bring the uterus out of the abdominal cavity. The child was delivered without difficulty, and hysterectomy performed, followed by a good recovery.

Upon examining the uterus after its removal, the scar was found to be deeply pigmented, as was the abdominal skin and also the areola.

In his second case, section was performed for pelvic deformity, produced by fracture of the pelvis when the mother was a child three years old. The uterus was closed, and sterilization effected by resecting the tubes.

A third case of section by the Porro method is reported for myoma of the pregnant uterus, rigid cervix, breech presentation in the fetus, and maternal diabetes. Mother and child made a good recovery.

The mother's puerperal period was complicated by fever two weeks after, with exudate in Douglas' cul-de-sac followed by suppuration, pus escaping by spontaneous rupture into the bowel. Several stitches were discharged with the pus.

THE CHOICE OF CESAREAN SECTION. Henkel² discusses at length the various Cesarean sections, and the grounds upon which the operation shall be chosen. He concludes that the difficult delivery of the child in extraperitoneal section places this operation at a great disadvantage when compared with the classic section. The technique of laparotomy is now so good that the danger of opening the peritoneal cavity is reduced to a minimum and need not weigh against the classic operation. For uninfected cases, or even for suspicious cases, in which great value is placed upon the life of the child, classic operation should be chosen rather than the transperitoneal; in patients evidently infected, embryotomy or hebosteotomy may be chosen. In multiparous patients, where hebosteotomy is indicated, the operation will give good results

¹ Zeitschrift für Geburtshilfe und Gynäkologie, 1910, Band lxvi, Heft 1.

² Ibid., Heft 2.

in spite of infection, and gives a fair chance for mother and child. In his opinion, Cesarean section should be performed in these cases.

Pankow¹ discusses this question in the light of his experience in Krönig's clinic at Freiburg. He would reserve the classic Cesarean section for placenta prævia, because he believes that the anatomical relations are such that the placental insertion at the isthmus uteri can best be dealt with by this operation. For contracted pelvis, he would perform intraperitoneal cervical section.

In considering the choice of section of the abdomen, or section of the pelvis, he believes that in uninfected cases the classic, the intraperitoneal, and the extraperitoneal cervical section give good results, but he would prefer the intraperitoneal cervical method. In a multipara, with the child in good condition, he would open the symphysis when the head of the child, with its greatest segment, had engaged in the brim of the pelvis. He lays stress upon this point as indicating the possibility of successful delivery after symphyseotomy. In doubtful cases, without fever, but in which the membranes have long been ruptured, and the case has been in unknown hands, he would choose his operation in accordance with the wishes of the parents. If a living child is greatly desired, he would choose intraperitoneal cervical section. In multiparæ, he would select pelvic section. In infected cases having fever, or foul amniotic liquid, he would decline both Cesarean and pelvic section. If the fetus were dead or dying, he would perform cranioclasia; or if the conditions seemed to render the birth of a living child possible, he would choose the Porro operation. The danger of inspiration pneumonia is so great that if the membranes have long been ruptured and meconium has escaped, embryotomy should be chosen. If the mother earnestly desires a living child, at her request the Porro operation may be selected.

POSTPARTUM CESAREAN SECTION. Venus² reports the case of a patient dying suddenly in her sixth labor in convulsions, and unconsciousness. Arriving about seven minutes after the death of the mother, Cesarean section was at once performed, with the extraction of a vigorous child, deeply asphyxiated, with a very faint heart beat which could not be revived. The placenta was on the upper and posterior portion of the uterine wall, was not prævia, and had not been prematurely separated.

Microscopic examination showed the cause of death to have been a violent and sudden toxemia culminating in eclampsia. During her pregnancy the patient had been well and there had not been the slightest evidence of disease. The eclampsia which proved fatal was without convulsions, its prominent symptom being rotation of the eyeballs, spastic contraction of the muscles, and rapidly deepening coma.

¹ Zeitschrift für Geburtshilfe und Gynäkologie, 1910, Band lxxvii, Heft 1.

² Zentralblatt für Gynäkologie, 1911, No. 2.

EXTRAPERITONEAL SECTION BY LATZKO'S METHOD. Cholmogoroff¹ reports the case of a patient with rachitic pelvis, a primipara, aged thirty-eight years, admitted to his clinic in Moscow. As the head failed to descend, and a contraction ring developed, the patient was delivered by extraperitoneal section by Latzko's method. The lateral ligaments of the bladder were plainly visible but were not divided, as it was possible to push them to the side. The cervix and lower segment were opened by a longitudinal incision 12 cm. in length, the urinary bladder being pushed toward the right side. The child was extracted by version, the uterine incision not being injured during delivery. The placenta and membranes were delivered without much hemorrhage. The uterus was closed with sublimate catgut and a drain of iodoform gauze placed between the uterine and abdominal wall. The gauze was removed on the seventh day after operation; the patient left her bed on the thirteenth day, and was discharged in good condition on the twentieth day.

Both mother and child made a good recovery.

SUPRASYPHISEAL SECTION. Küstner² has performed 24 cervical sections, with the loss of 1 mother from peritoneal sepsis. The children made good recoveries.

In operating, he varies his incision to the right or the left 5 cm. from the linea alba, in accordance with the position of the bladder. If the bladder is in the median line, he makes a median incision. When the head presents, he delivers it by a pair of forceps which he has especially designed for this purpose.

In choosing between the classic Cesarean section and the transperitoneal section, he believes that the former is safer for the mother and child than the latter.

EXTRAPERITONEAL SECTION AND THE DANGER OF UTERINE RUPTURE IN SUBSEQUENT CONFINEMENT. This interesting question is discussed by Lichtenstein.³ He reports 2 cases of repeated suprasymphiseal section in which the opportunity was given to examine the condition of the uterus after the first operation.

In the first case, the first operation delivered a well-developed child, and, at the request of the parents, abdominal section was done the second time, with sterilization. No trace of the first incision could be found, and but very slight alteration in the peritoneum in the region of the bladder and cervix.

In the second case, the pregnancy which followed after operation resulted in the development of twins and polyhydramnios. The patient was delivered by extraction through the vagina, preceded by version, one of the children surviving, the other having abdominal dropsy had perished before birth. The mother made a good recovery.

¹ Zentralblatt für Gynäkologie, 1910, No. 16.

² Ibid., No. 17.

³ Ibid., No. 26.

The author publishes a case reported by Scheffzeck in which a second cervical section was successfully performed. Also 2 cases reported by Hartmann, in which spontaneous birth followed the pregnancy succeeding cervical section. Four cases by Frank are reported in which suprasymphyseal section was repeated, and 2 additional cases by Frank in which suprasymphyseal section was twice repeated.

He concludes from these facts that suprasymphyseal section does not predispose to rupture of the uterine scar in subsequent parturition.

FOUR CASES OF LABOR AFTER SUPRASYPHISEAL SECTION. Hartmann¹ reports a case of face presentation and prolapse of the cord in which the cord ceased to beat in a patient previously delivered by suprasymphyseal section. As the child was dead, perforation and cranioclasia was performed. The placenta was removed by the hand, and no abnormality could be detected in the uterus upon palpation. The mother made a good recovery.

The second patient was one upon whom suprasymphyseal section had been performed several years previously. The patient was delivered by an oblique incision parallel to Poupart's ligament, exposing the epigastric artery and vein, which were ligated and divided. The uterus was opened in its lower portion and the child delivered by a forceps blade and pressure upon the fundus. The uterine wound did not enlarge. Mother and child made a good recovery.

His third case was one previously delivered by suprasymphyseal section, and the operation was repeated. It was successful, union occurring by first intention. No essential change in the tissues could be detected at the second operation.

The fourth case was first delivered by suprasymphyseal section for contracted pelvis and placenta prævia. The second operation was performed with the pelvis raised and by an oblique incision parallel to Poupart's ligament. The epigastric vessels were ligated and divided.

Upon opening the uterus, profuse hemorrhage occurred, as the placenta had been wounded, which terminated on the delivery of the child by version and extraction and the removal of the placenta. It was feared that injury had been done to the bladder, and drainage was used after the operation.

SUCCESSFUL CASES OF SUPRASYPHISEAL SECTION. Gerstenberg² performed suprasymphyseal section for face presentation and threatened uterine rupture. The child was large—54 cm. long, and weighed 8¼ pounds. It was deeply asphyxiated and was revived with difficulty.

Mother and child ultimately made good recoveries.

Streit³ reports 3 cases of suprasymphyseal section by Latzko's method, with a successful result for mother and child.

¹ Zentralblatt für Gynäkologie, 1910, No. 28.

² Ibid., No. 41.

³ Ibid., No. 43.

AN AUTOPSY UPON A CASE DELIVERED BY SUPRASYPHYSAL SECTION. Bardeleben¹ reports the case of a multipara with contracted pelvis who was operated upon by suprasymphysal section two hours after the beginning of labor pains, while the cervix was still present and the membranes had not ruptured. The operation lasted twenty-eight minutes, and the convalescence was uninterrupted until the morning of the fifth day, when the patient died suddenly from embolism.

At autopsy, the pulmonary artery was occluded by two masses the length and thickness of a finger. The peritoneum seemed healthy. The cellular tissue in the vicinity of the bladder was infiltrated, but without pus, and sterile upon examination. The veins in this region were many of them thrombosed, and thrombosis had begun in the veins of the lower extremities.

Experiments show that streptococcus invasion of cellular tissue is often of brief duration, and the fact that it was found sterile in the vicinity of the bladder does not prove that a streptococcus invasion had not been the original cause of the thrombosis.

The autopsy demonstrates the danger of the operation, namely, the occurrence of thrombosis and embolism from the large number of veins in the connective tissue in the vicinity of the bladder and lower uterine segment.

THE AFTER-CONDITION OF PATIENTS OPERATED UPON BY SUPRASYPHYSAL SECTION. Sigwart² operated upon 27 patients, of whom 2, or 7.4 per cent., died. The children all survived. Ten of these patients were subjected to examination some time after their discharge. In 6, there was retroflexion of the uterus, and, in 2 of these, the uterus was mobile and easily replaced. In four, replacement was impossible because the cervix was adherent to the abdominal scar and could not be displaced. This had caused retroflexion, as it permanently kept the cervix forward. In some of these cases, the body of the uterus was deflected to the right, and the cervix to the left.

This cannot be ascribed entirely to Latzko's method, for Sellheim reports a case of similar displacement after his operation. In 11 cases operated upon by Sellheim's method, the peritoneum was wounded in 8, and the bladder in 3; while in 13 operated upon by Latzko's method, the peritoneum was wounded in 3 only, and the bladder in 1.

SOLMS' MODIFICATION OF VAGINAL SECTION. Solms,³ in performing vaginal section, carries the cervical incision upward and toward the right, thinking that by this method he can most easily and safely open into the lower segment. If necessary, he adds the vaginal section in the inguinal region, which thus gives free access to the uterus.

He appends a table of 21 cases in which this method was employed.

Koblanek⁴ reports a case of section by Solm's method. The patient

¹ *Zentralblatt für Gynäkologie*, 1910, No. 48.

² *Ibid.*

³ *Ibid.*

⁴ *Ibid.*, No. 23.

was a primipara with a flat, rachitic pelvis, and the test of labor showed that vaginal delivery was impossible. Operation was performed by an oblique incision from the symphysis to the anterior superior spine through the skin and fascia. The bladder was carried toward the right and the peritoneum pulled upward. Ergotin was injected. The lower uterine segment was incised longitudinally in the median line and hemorrhage encountered from veins, which did not, however, prove serious. The incision was prolonged downward under the guidance of the finger.

The child was delivered by forceps, the placenta expressed, and the uterus tamponed with gauze, which was brought out through the vagina. The uterine wound was closed, when it was found that the bladder had been wounded. This was closed by suture, and the skin and fascia brought together, leaving a strand of gauze for drainage and a permanent catheter in the bladder.

The mother's convalescence was somewhat disturbed by moderate fever, but she ultimately made a good recovery, and the wounds completely healed. The child did well.

VAGINAL CESAEREAN SECTION IN THERAPEUTIC ABORTION AND PREMATURE LABOR. Klein,¹ in 17,000 patients upon whom 4200 operations were performed, in 35 practised therapeutic abortion, in 7 by vaginal Cesarean section. The decision to operate was determined after consultation. The indications for operation were pulmonary tuberculosis in 18, pernicious nausea in 2, pyelitis with chills in 4, and osteomalacia and nervous and mental disturbances in 11; 28 of these patients were treated by dilatation of the cervix with laminaria tents; 7 of them had high fever and septic infection afterward.

This led to the adoption of vaginal Cesarean section in 7 cases, the results being much more satisfactory.

EXTRAPERITONEAL SECTION AND HEBOSTEOTOMY. Döderlein² describes his method of performing extraperitoneal section, which much resembles the gastro-elytrotomy which Thomas proposed to the American profession and practised in 1870.

Döderlein performs the operation by placing the patient in the Trendelenburg position, with the pelvis greatly elevated. That side is chosen on which is situated the fetal head. The incision is made parallel to Poupart's ligament from the anterior superior spine of the ilium to the symphysis. In most of his operations, the right side was selected.

In the first operations, Pfannenstiel's transverse incision was practised in opening through the skin and fascia, but this was abandoned for the inguinal incision. The skin, superficial fascia, and oblique

¹ Monatsschrift für Geburtshülfe und Gynäkologie, 1911, Band xxxiii, Heft 2.

² Ibid., Heft 1.

muscles are separated, and the edge of the rectus drawn aside. The epigastric vessels are exposed and are separated between double ligatures. The lower portion of the uterus is then located with the finger and the connective tissue separated, and the right round ligament exposed, which in one case was ligated and severed between ligatures. It is usually possible to draw it to one side. The ureter was not exposed and was in no danger. The peritoneum is then drawn upward and the bladder drawn toward the symphysis, and an incision made in the uterine wall one or two fingers' breadth distant from the lateral border of the bladder. The uterine tissue is greatly thinned at this point in labor, and no difficulty was experienced in getting down upon the fetal head. It was not necessary to open the vagina, and the head of the child was delivered through this incision by forceps. In one case, the opening into the uterus was followed by such profuse venous hemorrhage that the wound was hastily packed with gauze and the operation concluded by abdominal Cesarean section. It was afterward possible to close both incisions, and the patient made a good recovery.

After the delivery of the child the uterus is closed by a continuous catgut stitch, and care is taken to stitch the connective tissue at the edge of the bladder to the serous covering of the uterus. The abdominal wounds are then closed without drainage.

Döderlein practised this operation in 32 cases, with 3 maternal deaths, and the loss of 2 children. One of the mothers died of eclampsia twelve hours after operation, 19 convulsions occurring after the delivery of the child.

In a second case the patient had been four days in labor, had been repeatedly examined, had a temperature of $103\frac{1}{2}^{\circ}$ F., and a foul discharge from the uterus, the membranes having ruptured thirty-four hours before admission to the hospital. The child could not be revived, as it had inspired infected matter from the mother. The mother died eight days after operation from acute sepsis, with profuse suppuration in the connective tissue of the pelvis and gangrene of the bladder.

The third fatal case died from paralysis of the intestine. The abdomen became greatly distended two days after operation, and on the fourth day an effort was made to establish an artificial anus, the patient dying during the operation. Section revealed no cause for the death, and no evidence of infection could be found.

Of the 30 children born living, 2 died during the first week of life, and 28 left the hospital in good condition.

Döderlein has performed 53 hebosteotomies, with one maternal death from paralysis of the intestine. Autopsy showed no injury as the result of the operation. He has collected from 7 clinics 321 cases, with a maternal mortality of 1.8 per cent.

He believes it is impossible to lay down positive grounds for the choice in all cases of the various methods of delivery. He would limit hebo-

teotomy to multiparæ with contracted pelves of the first and second grades, and with a true conjugate of not less than 7 cm.

As regards the various methods of extraperitoneal and transperitoneal section, he believes that we are not yet in a position to definitely choose. The operation which he practised is technically more difficult than others; the delivery of the child may be a matter of some difficulty, and the recovery of the patient may not be uncomplicated. In infected cases, neither hebosteotomy nor suprasymphyseal or extraperitoneal section should be performed.

ELEVATION OF THE PELVIS IN OBSTETRIC OPERATIONS. Bumm¹ draws attention to the value of the Trendelenburg position in obstetric surgery. He quotes Döderlein's paper just preceding, and gives his own experience in suprasymphyseal section in 42 cases, with 3 maternal deaths, and with no fetal mortality.

In the first maternal death, it was impossible to tell whether eclampsia or infection was the cause of death. In the other 2, infection of the connective tissue caused the fatality; in one case, the infection originating from the amniotic liquid which contained bacteria.

In the third case, infection was recognized, and drainage with viform gauze was employed, but without success. The patient died of septic thrombophlebitis with pyemia. He has observed the formation of pus in the wound in those cases in which the amniotic liquid was infected at the time of operation.

He also practises delivery in the Trendelenburg posture in cases of internal version, in cases in which it is necessary to bring down the foot in breech presentation, in prolapse of the cord, and when it is necessary to rectify the position of the head in brow and face presentation.

THE TECHNIQUE OF SUPRASYPHISEAL SECTION. Frank,² in his recent suprasymphyseal section, waited for thirty minutes or more for the spontaneous delivery of the placenta.

He narrates 5 cases thus treated, with excellent results for mother and child. He believes that hemorrhage is less by this method and that there is less danger of wounding the maternal tissues, and thus increasing the liability to thrombosis. In none of the 5 cases was it necessary to interfere to deliver the placenta.

THE CLASSIC CESAREAN SECTION COMPARED WITH OTHER METHODS. Kouwer³ has performed the classic Cesarean section, with a maternal mortality rate, in 60 cases, of 1.72 per cent.

He reviews the literature of the suprasymphyseal and extraperitoneal section, and calls attention to the many complications of parturition, such as fibroid tumors and pelvic tumors, which could not be successfully dealt with by this method. His conclusion is very positively in favor of the classic section.

¹ Zentralblatt für Gynäkologie, 1911, No. 9.

² Ibid., No. 6.

³ L'Obstétrique, January, 1911.

THE ALTERNATIVES FOR CESAREAN SECTION. Routh¹ discusses the question of what can be done to deliver patients who have been long in labor and exposed to infection. He calls attention to the dangers of extraperitoneal section, and to the fact that disturbance of the connective tissue in the vicinity of the bladder would favor the development of infection. He discusses the possibility of choosing operation by examining the vaginal and other secretions. He believes that when the membranes have not been ruptured that the vagina can be disinfected by sublimate douches. In cases in labor for some time, with the membranes ruptured, if the amniotic liquid was found sterile, the classic Cesarean section could be undertaken; and if the patient has been in labor for some hours, and the membranes ruptured with attempts at delivery, and the discharge offensive, he considers that there would be danger of failure in primary union of the uterine wound, and possible fatal peritonitis.

In cases in labor for some time, with evidence of infection, craniotomy should be performed if possible. In infected cases, he finds that hysterectomy with dropping the stump, in cases collected by him, gave a mortality of 13.8 per cent. He believes that if the cervix is left in these cases, the canal should be disinfected from above with iodine or carbolic acid, drained by a strip of gauze, and carefully covered with peritoneum. Porro's operation, with extraperitoneal treatment of the stump, compares favorably with other methods. Abdominal panhysterectomy is difficult in some cases, and exposes the child to the risk of death if the uterus be removed unopened.

In 96 cases, the reviewer's chosen methods of Cesarean section are as follows: If no previous attempt to deliver has been made, and the patient has been examined only by reliable persons, and has not been long in labor, with unruptured membranes, the case is considered sterile, and the classic Cesarean section done. In all cases, the uterus is removed from the abdominal cavity, and the abdominal contents carefully protected by gauze compresses wrung out of hot sterile salt solution. After the uterus is empty, sterile salt solution is poured through the uterus from above. The abdomen is closed without drainage.

In cases which have been long in labor, with repeated examinations by persons whose methods are not known, and with ruptured membranes, the case is considered doubtful, and in addition to the technique just described, the uterus is packed with iodoform gauze, which is brought out into the vagina.

Cases in which unsuccessful efforts have been made to deliver, and in which the patient has been long in labor, with ruptured membranes, are considered as infected. The patient is delivered by embryotomy, or by the Porro operation.

¹ Journal of Obstetrics and Gynecology of the British Empire, February, 1911.

We have tried hysterectomy with dropping the stump in suspected cases, with bad results. In other suspected cases the ordinary classic section has been followed by suppuration in the uterine stitches, in one case requiring hysterectomy some months later.

The methods described have given good results in the conditions indicated.

MULTIPLE CESAREAN SECTION. McPherson¹ reports 39 repeated Cesarean sections in the New York Lying-in Hospital. Thirty of these operations were done for the second time, 7 for the third time, and 1 for the fourth and fifth times. In 18 cases, there were no adhesions; in 11, very few; in 7, many; in 1, the uterus was adherent to the abdominal wall, and in 2 cases this condition was not noted; in 9 cases, the scar of the former operation was not seen; in 25 cases, the uterus was not thinned at the site of the former incision; in 4 cases, it was very thin at this point, and in 1 case the old scar had ruptured, there being many adhesions to the uterus.

Three deaths occurred among the mothers—one from anesthesia before the uterus was opened, one from sepsis on the third day, and one from pneumonia on the fifth day. One child died of hemophilia on the sixth day.

His observation coincides with that of others who have studied the rupture of the uterus after section. It will be noted that in his cases but one was observed in which the uterine scar had ruptured, and in that there were many adhesions. The formation of adhesions predisposes to rupture because it interferes with the normal development of the uterine muscle in the scar.

It is obviously impossible to endeavor to produce adhesions between the uterus and surrounding tissues at the time of operation.

TWENTY-SEVEN CESAREAN SECTIONS WITHOUT MATERNAL MORTALITY. Boyd² reports 27 Cesarean sections without maternal mortality. In 14 cases, the operation was performed before labor; in 13, there was the test of labor. There were 6 cases of repeated section. One operation was performed for twin pregnancy complicated by the toxemia of pregnancy.

The important points for a successful operation are believed to be a careful selection of cases, a study of the fetal heart sounds prior to operating, and accurate closure of the uterine incision.

THE FETUS AND ITS APPENDAGES

Fat in the Placenta. Bondi³ reports the results of investigations made in Paltauf's laboratory in Vienna, to determine the presence of fat in the

¹ American Journal of Obstetrics, March, 1911.

² Ibid.

³ Archiv für Gynäkologie, 1911, Band xciii, Heft 2.

placenta. He finds fat drops present, as a rule, in the syncytial cells of the chorion, arranged usually in regular order about the nucleus. The quantity of fat is greatest in the first months of pregnancy, and diminishes as pregnancy proceeds. In the stroma of the villi but very little fat is found during the whole pregnancy. In cases in which the fetus dies, the quantity of fat is increased.

The mother's condition, as regards nutrition, seems to have nothing to do with the quantity of fat present. The life of the fetus does not determine the presence of fat. If the syncytium undergoes absorption, the fat, as a rule, disappears. When the viscera of the mother undergo fatty degeneration, as in phosphorus poisoning, the fat in the syncytium does not increase. It must be considered as a resorption fat deposit in the placenta from the blood of the fetus.

The Development of Placenta Prævia. Jolly¹ describes several cases in which he has had the opportunity to study the development of placenta prævia. He finds that this condition arises when the ovum primarily has its insertion in the lower portion of the uterine cavity. This insertion depends largely upon the site of impregnation. There is usually a definite period between impregnation and the insertion of the ripe ovum. The nearer the uterus and the Fallopian tube the pregnancy occurs, the farther from the orifice of the tube in the uterine cavity will the impregnated ovum attach itself. Various conditions of the mucous membrane of the uterus have an influence upon the insertion of the ovum. Endometritis may produce variations from the normal. Myoma of the uterus, and the alterations in its lining membrane which accompany myomata, may also bring about placenta prævia. When the placenta develops in the decidua capsularis above the internal os, this occupies the lowest point in the fetal envelope, and covers the internal os, and thus enters into a placenta prævia. The nourishment of a portion of the placenta not directly attached to the uterine wall is largely derived from the vessels of the decidua which convey blood to the uterine sinuses. As a rule, the decidua capsularis does not join with the decidua vera at the internal os, as it does not at the opening of the Fallopian tube. The pressure of the ovum may cause adhesion of both layers, which is easily separated through dilatation of the internal os and extravasation of blood. As the internal os is covered by the decidua capsularis, it does not adhere at this point. Placenta prævia in the early months of gestation may clinically be confused with carcinoma of the uterus. A preliminary low implantation of the ovum, and the resulting placenta prævia, frequently cause the interruption of pregnancy. Many spontaneous abortions result from placenta prævia. The bleeding of placenta prævia occurs through the loosening of the decidua capsularis from the

¹ Archiv für Gynäkologie, 1911, Band xciii, Heft 1.

decidua vera by the dilatation of the os, which opens the vessels in the decidua capsularis which are in communication with the site of the placenta. This may lead later to partial separation of the placenta from the uterine wall, or the laceration of the connective tissue of the placenta.

From these points it follows that the treatment of placenta prævia should consist in compression of the bleeding placental site, with dilatation of the cervix. Abdominal and vaginal Cesarean section, and the use of Bossi's dilator, are not indicated. In rare cases, with extreme blood loss, which do not receive prompt attention, the total extirpation of the uterus by abdominal section may be indicated.

Hoehne,¹ in criticising Jolly's paper, reviews his own investigations, from which he concludes that the insertion of the impregnated ovum depends considerably upon the ciliated condition of the uterine epithelia. Under normal conditions, this causes the attachment of the ovum above the internal os.

He draws attention to the fact that disease of the uterine mucous membrane causing atrophy, destroys the ciliæ of the epithelia and permits the ovum to attach itself lower than normal. In some cases in which the ciliæ are strongly developed, the ovum may be expelled from the uterus instead of adhering as normally in the upper portion of the uterine cavity. When the endometrium is thickened, the ciliæ are unusually developed, as seen in cases of profuse menstruation, myomatous uterus, persistent hemorrhage after abortion, and in menorrhagia preceding the menopause.

Hemolysis in its Relation to Icterus Neonatorum. Slingerburg² reviews the literature of the subject, and adds the results of his own investigations. He finds that in the fetus the resisting power of the red blood corpuscles compares favorably with a hypotonic salt solution in the majority of cases, when compared with the resistance of the adult individual in labor. The resisting power of the blood in the umbilical cord after it has ceased to beat compares favorably with that in the blood of the fetus after birth. In some cases it is greater.

In the blood of a child, an hour after birth, the resisting power is fully equal to that of the blood in the umbilical cord, or is even greater. There seems to be no difference in the resisting power of the blood in the fetus at birth in those cases which later have icterus and those which do not. During the first days after birth this resisting power increases with all children, being greatest on the average on the third or fourth day, and then declining. Up to the tenth day there is very little change. The average resistance power of the blood in the fetus is greater up to the tenth day than in the blood of the adult person. This seems to be increased in children who have icterus. It is possibly caused

¹ Zentralblatt für Gynäkologie, 1911, No. 9.

² Archiv für Gynäkologie, 1911, Band xciii, Heft 1.

by the entrance of bile into the blood. This is present in all children in different degrees. Icterus neonatorum is of hepatogenic origin.

The Results Obtained in Newborn Children by Nursing Every Four Hours. Helleman¹ reports the results obtained in Menge's clinic at Heidelberg, in allowing newborn children to nurse not more often than every four hours. He finds that the loss in weight usually seen in newborn children with four-hour nursings, lasted on the average 2.95 days, and did not exceed 243.9 grams. The gain in weight began in 80.2 per cent. after 6.06 days. In 79.4 per cent. on the fourteenth day; in 73 per cent. on the tenth day; at the end of the twelfth day, 89.8 per cent. had made good the initial loss and had reached their weight at birth, and were still gaining.

When the results of these investigations are summed up, it is found that in cases where no pathological condition existed, the four-hour interval nursing gave good results.

The advantages in this method lie in the longer period of rest for the mother, the better condition of the breasts, their lessened irritation, with less tendency to mastitis, and the fact that when a mother nurses her child not oftener than four hours, she has an opportunity to carry on the work required in her household to better advantage.

Intra-uterine Fracture of the Humerus Healed in Pseudarthrosis. Rosenthal² reports the case of an anencephalus with polyhydramnios delivered by version and extraction. The placenta was edematous and there were numerous malformations in the fetus.

The use of the Röntgen rays showed that the fetus had sustained a fracture of the left upper extremity, which had healed in pseudarthrosis. During the pregnancy which preceded the birth of the fetus, the patient sustained a severe fall, which was indoubtedly the cause of the fracture of the humerus. Adhesions of the amnion may also have contributed to this result. In all probability the accident happened as early as the second month of gestation. The humerus had healed in pseudarthrosis.

Fetal Singultus. Rothschild³ reports the case of a multipara in whom labor was induced for contracted pelvis. The head did not descend and fetal singultus developed. The patient had previously been delivered by symphyseotomy, and accordingly pubiotomy was declined.

While examining the patient to determine the possibility of version, the hand introduced into the uterus distinctly recognized the effort of swallowing on the part of the fetus. A stethoscope placed upon the abdomen could distinctly recognize the characteristic sounds. This phenomenon occurred thirty times to the minute, and was rhythmical in character. Death of the fetus occurred shortly afterward and the child was delivered by perforation and cranioclasia.

¹ Monatsschrift für Geburtshülfe und Gynäkologie, 1911, Band xxxiii, Heft 2.

² Ibid.

³ Zentralblatt für Gynäkologie, 1911, No. 3.

Upon examining the fetus, no anatomical cause could be found for the phenomenon. There was no diaphragmatic hernia.

Malformations of the Extremities in the Newborn. Mayer¹ reports the case of a fetus born spontaneously, having upon each hand at the ulnar side a small rudimentary finger attached by a pedicle to the little finger. This rudimentary finger was covered by skin and had a well-formed nail. There was no bone or bony tissue in the rudimentary finger. The malformation consisted of a double but undeveloped digit.

While this malformation is very common upon one hand only, it is rare on both sides. It is thought that hemorrhage from the decidua reflexa causing a clot might make pressure upon the amnion and thus cause the formation of amniotic bands, interfering with the development of the fetal extremities.

He also reports the case of a vigorous male child spontaneously born in face presentation, with failure of development of the right thigh, the leg and a well-formed foot being attached directly to the anterior, pelvic region, the foot being movable upon the rudimentary lower extremity. It was impossible to demonstrate a characteristic hip-joint or bony tissue upon the affected side. The Röntgen rays showed a typical leg with the tibia and fibula directly attached to the anterior pelvic wall. There was no trace of the thigh.

Upon examining the abdomen of the child a long bone with a medullary canal could be detected at the side of the ischium, which was undoubtedly the missing femur.

The case was considered one not of failure of development of the femur, but of failure in the descent of the femur when the lower extremities were developed. Whether this was caused by a tumor in the uterus, possibly a fibroma pressing upon the fetus, or through some amniotic band, could not be determined.

A third case is reported in which the lower extremity was bent sharply upon itself, the unnatural position being caused by a broad band extending from the umbilical cord to the junction of the middle and lower third of the thigh. This was 2 cm. in breadth and derived from the amnion.

The practical point in these cases lies in the fact that we are enabled by the Röntgen ray to positively determine the presence or absence of bones normally formed, and when amniotic bands produce deformity they may be separated by surgical means, and in some cases the deformity relieved.

Congenital Deformity of the Cranium Caused by Amniotic Adhesions. Kehrer² has collected from the literature 32 cases of abnormalities in the cranium produced by amniotic adhesions. He adds the case of

¹ *Monatsschrift für Geburtshilfe und Gynäkologie*, 1910, Band xxxi, Heft 1.

² *Ibid.*, Heft 2.

a fetus born from a healthy primipara in spontaneous labor. Between the parietal eminences and the sagittal suture on the summit of the cranium there existed deep irregular defects in the cranial bones. These were symmetrical in their arrangement. The defect extended through the skin, fascia, periosteum, and bone to the membranes of the brain, so that the brain could be seen and its pulsations observed. The finger placed in these defects could feel the cerebral pulse more plainly than through the anterior fontanelle. The borders of these openings were covered by apparently fresh blood clots. At the borders of the scalp was an area of rose-colored connective tissue without hair. Similar but smaller lesions were found in the vicinity of the greater fontanelle through which the edges of the normal bone could be felt. The child was discharged from the hospital on the twelfth day apparently in a healthy condition. The edges of the openings had almost grown over, but the bony defects between the two parietal edges were apparently evident. It was thought that the hemorrhage in the region of these lesions was occasioned by birth pressure.

Upon examining the literature of the subject, it is found that these defects have usually been observed in the parietal bones near the sagittal suture, and occasionally in the region of the smaller fontanelle, but most of them are in the vicinity of the larger fontanelle. In one case, the defect was behind the right ear in the occipital region, and in other cases in the vicinity of the eyes and the forehead. The size of these apertures in the cranium differed very greatly, the largest being as large as a silver dollar.

While most of these were round in shape, some were elongated. One was in a shape resembling a cross. The importance of these apertures, from the medicolegal standpoint, may be inferred from the fact that they must be distinguished from wounds inflicted purposely upon the fetal cranium. While hair is not present over these apertures it will grow subsequently if the child lives, although in some cases, four years after birth hair had not grown, and the child was brought for treatment for alopecia. The borders of these apertures are usually well defined, and can apparently be made out. The wounds are usually fresh in appearance, sometimes as cleanly cut as with a knife; at other times evidently not recent, and partially healed. Occasionally suppuration has occurred when a considerable time elapsed between the rupture of the membranes and the birth of the child. Similar formations in other portions of the body, as the knee and elbow, have been observed. In some of the cases other formations besides these were present, as cerebral hernia, amniotic bands deforming the right hand, hydrocephalus, coloboma polydactylia, microphthalmus, double harelip. deformity of the jaw, deformity of the right ear, and abnormal development in the gums.

These deformities are referred to amniotic adhesions and bands and

plastic inflammations of the superficial tissues in the fetus. In some cases the mother sustained wound or injury during the early months of gestation, producing injury to the amniotic adhesions and subsequent plastic inflammation. In one case, the mother was tossed by a cow; in another, the mother fell down a flight of stairs; in another case, the mother fell upon her abdomen, deformity resulting. It is possible that inflammation of the amnion and superficial fetal tissues may have caused deformity when trauma was absent, and some were assigned to dermoid cysts of the amnion and retention cysts as the exciting cause. Alterations in the epithelia of the amnion have also been observed. It is impossible to accurately trace the connection between mechanical injuries in labor or injuries inflicted upon the fetus during labor by those who attend the mother. Thus, in one case it was supposed that a sharp finger-nail from the hand of a student attending the mother had wounded the forehead of the child, but this was proved not to have been the cause.

These injuries are of interest from their medicolegal significance when efforts have been made to destroy the fetus in utero or during birth. Such injuries would cause hemorrhage, wounding, and lacerations of the scalp and bones of the cranium, but upon examination it was found that wounds made intentionally would not have similar edges as seen in these congenital defects.

Microscopic examination shows the absence of the various elements in the tissues at these points and not the wounding of normally developed tissue. The same principle of discrimination applies to congenital defects in other portions of the body.

The Etiology of Malformations in the Female Genito-urinary Tract. Weibel¹ reports 2 cases of malformation in the genito-urinary tract in the female fetus. In one, there existed a double uterus with atresia in the right half, and the accumulation of secretion in the cervix. There undoubtedly existed a very fine fistula between the uterus and the vagina permitting the gradual escape of the uterine contents.

The second case was also one of double uterus in which there was found in the right cervix a band of tissue 10 cm. long, having a lumen which communicated with the opening in the cervix. This lumen disappeared gradually and the band became solid. The lumen was covered with epithelia and was proved to be an inflamed and occluded ureter. No other trace of the Wolffian body could be found in both uteri. It is possible that this band was a remnant of the Wolffian body or an abnormally situated ureter.

In the third case of double uterus, the right ureter was normal but the left was rudimentary, the left kidney being but one-fourth of the normal size.

¹ *Monatsschrift für Geburtshilfe und Gynäkologie*, 1910, Band xxxi, Heft 2.

The interesting point in these cases lies in the simultaneous development of malformation in the uterus and ureter. Both must be referred to abnormality in the evolution of Müller's body and the Wolffian body. It is supposed that the obliteration of the ureter occurred through pressure.

The Abnormally Large Fetus. Delmas¹ puts the average weight of the fetus at 3250 grams. In 1000 children examined, 46 could be termed abnormally large—a proportion of 1 in 22. The size of the fetus increases with the multiparity of the mother, and in 3 cases, in which the mother had borne 8 children, the fetus weighed 4330 grams. The largest weight was 4700 grams in a tenth child.

As regards the length of gestation in these cases, in 17 of the 46 labor was, as nearly as could be ascertained, at term. In 19, pregnancy was prolonged; and in 10, the length of gestation could not be accurately estimated.

The age of the mother is of considerable importance, as the largest children are produced by women averaging from twenty-eight to twenty-nine years. So far as the development of menstruation was concerned, fourteen years of age seemed the most favorable period for the subsequent birth of large children. It is found that most women giving birth to large children have some occupation which is not excessively exhausting and fatiguing. The longer the patient is in the hospital before her confinement, and the better her surroundings, the greater the weight of the child. The size of the placenta and the quantity of amniotic liquid seems in proportion with the fetal size. There is no evidence that disease, provided the mother made a good recovery, has especially influenced the size of the child. Syphilis cannot be proved to be an important factor, provided the mother has received adequate treatment. So far as sex is concerned, in the 46 children, there were 28 males and 18 females.

In diagnosing the size of the fetus, one must rely largely upon palpation at different periods of gestation. The height of the fundus should be measured at regular intervals after the sixth month. A well-formed large fetus is symmetrical in its various measurements, the length varying from 53 to 58 cm. The placenta weighs in some cases as much as 660 grams. The length of the ovum before the escape of the fetus from its membranes was found to be 50 cm.; the quantity of amniotic liquid about 500 grams, and the presentation usually that of the head. The width and development of the shoulders are of special importance in prognosticating labor. The large fetus is subjected to a much greater mortality and morbidity rate in labor than in the fetus of normal size.

The Passage of Chemical Substances from the Mother to the Fetus. Nicloux² has studied at considerable length the passage of chemical

¹ L'Obstétrique, April, 1910.

² Ibid., 1909, No. 11.

substances from mother to fetus. He finds that various gases, including anesthetic vapors, pass from mother to child; that chloroform passes rapidly; that anesthesia by chloroform of two minutes' duration, after five minutes had been occupied in preliminary inhalation, was sufficient to cause the passage of chloroform to the fetus. Chloroform can be isolated from the fetal liver in a much greater proportion than from the maternal liver. Chloroform combines readily with fatty substances; with lecithin or tissues rich in lecithin. Ether seems to pass from mother to child as readily as chloroform, but seems to have a less active influence upon the liver and fatty tissues. Mineral substances can be isolated in the fetus after administration to the mother. Alcohol given to the mother preceding and during labor, passes readily to the fetus and can be detected in the fetal glands and secretions; and forms a variety of alcoholism which can be termed "congenital." Alcohol can be readily detected in the amniotic liquid. One hour and thirty minutes after alcohol has been given to the mother it can be isolated from the amniotic liquid of the fetus. Salicylates, morphine, atropine, curare, and ergotin, have all been proved to pass from mother to child.

In studying the mechanism of the passage of these substances, we find that the equilibrium between the blood of the mother and child is an important factor. Chloroform must be considered an oxide of carbon, having special affinity for the blood corpuscles of the fetus. It is shown that the blood cells will take up seven or eight times more chloroform than the plasma of the blood.

In general, it may be stated that chemical substances pass from mother to child by dialysis, in proportion to their dialyzing properties.

Maternal Nephritis, Placental Edema, Congenital Nephritis, and Edema in Twins. Sitzenfrey¹ reports the case of a multipara who early in her pregnancy suffered severely from influenza. This was followed by edema of the lower extremities and prostration, which caused the patient to enter the hospital.

Upon examination, the mother was found to have nephritis with twin pregnancy. The amniotic liquid was in excess, and, as the mother suffered greatly from pressure, the membranes were ruptured and over a quart of amniotic fluid allowed to escape. Labor gradually developed with the birth of female twins, the twins dying soon after delivery. Upon examination, the placenta was found to be edematous, and in both twins there were ascites, enlargement of the spleen and liver, the formation of fibrin in the fluid of the abdomen, and congenital nephritis. Upon examining the placenta, edema of the villi of the chorion was found, which is present, as a rule, in syphilis of the placenta. The villi were enlarged by the deposit of granulation cells. Spirochetes could not be recognized. The cord showed characteristic edema. The

¹ Zentralblatt für Gynäkologie, 1910, No. 43.

Wassermann reaction for syphilis was tried three times with the blood of the mother, with a negative result. The epiphyses were normal in both fetuses, so that syphilis could not be established as a cause for the condition present. The mother's nephritis subsided after the birth of the children and she made a good recovery.

The most reasonable explanation of the condition was that of influenza in the mother.

A second case is also reported where labor was induced because the mother had nephritis, the child gradually developing edema after the second day following its birth. This gradually subsided, and when six months old the child was perfectly healthy.

The Dissection of the Fetus with Küster's Rhachiotome. Seuffert¹ reports the case of a patient attended by a midwife whose labor did not proceed spontaneously. Upon examination, fetal heart sounds were absent and a thin, greenish fluid escaped from the vagina. Upon examination, the cervix was partially dilated, the pelvis empty, and at the brim of the pelvis could be found the breast, the ribs, and the spinal column of the child, the breech lying upon the right side, and upon the left the scapula could be recognized. The patient was given morphine to lessen uterine contractions, and admitted to the hospital.

Under deep anesthesia it was impossible to reach the neck. Küster's rhachiotome was then applied, although it was not possible to apply both blades with the breech of the child as Küster advises. The instrument was applied as well as possible to the child's trunk and closed, when it was found that the vertebra had been severed. The soft parts were then severed by the decapitation hook, the head extracted by the fingers in the mouth, and the remainder of the child by traction upon the feet.

Eclampsia at the Sixth Month with Blighted Ovum. Sitzenfrey² reports the case of a patient six months pregnant, taken with violent eclampsia. No fetal heart sounds could be recognized nor could the position or presentation of the fetus be determined. Vaginal Cesarean section was performed and a molar pregnancy removed from the uterus. The uterus was tamponed with gauze and the incision closed. The mother made a good recovery.

Upon examining the specimen, it was found to be a molar pregnancy with hydrops in the villi of the chorion. The epithelia and connective tissue of the amnion were lacking, and there was proliferation of stroma cells with the large nuclei. There was also considerable growth in the syncytium and in Langhorn's layer.

The case is interesting as showing the possibility of eclampsia, independently of material derived from the fetus.

¹ *Zentralblatt für Gynäkologie*, 1910, No. 35,

² *Ibid.*, 1911, No. 9.

DISEASES OF THE NERVOUS SYSTEM

By WILLIAM G. SPILLER, M.D.

DISEASES OF THE BRAIN

Brain Tumor. TUMOR OF THE PARIETAL LOBE. The value of *astereognosis as a localizing sign of lesion of the parietal lobe* has been well established, and a case reported by Edwards and Cotterill¹ is further proof of the correctness of this statement. Their patient had no motor weakness, but frequently dropped things out of her left hand, unless she kept looking at what she was holding. As long as she looked at her hand she was able to keep a firm hold, but when her attention was distracted she seemed to lose all sensation of holding anything. When she was tested she was unable to recognize any article placed in the hand, and could not distinguish between a penny and a ball of worsted. She had occasionally sudden pallor of the left arm and hand, apparently due to arterial spasm. The condition described by these authors as *astereognosis* is called *asymbolia* by others. Chiefly because of this sign, the right inferior parietal lobe was exposed and a glioma about the size of a large walnut was removed. Recovery was extremely slow, but there had been no recurrence eighteen months after the operation. The authors do not think it is wise to leave a glioma without an attempt at removal, when it is found at operation, as even a single case, such as they describe, seems to cast very serious doubt on the wisdom of abstaining from removal being made the routine practice.

TUMOR OF THE PREFRONTAL LOBE. Dercum's² three cases of prefrontal tumor presented symptoms of interest. In one, beginning paresis might have been considered. Headache had never been pronounced, and was present only for a short time previous to death. There was no optic neuritis. The only symptom that was at all suggestive was one attack of slight twitching of the left leg and possibly twitching of the left arm.

In a second case, the feature of interest was slight flattening of the lower half of the right side of the face and slight involvement of the left upper and lower limbs which Dercum thought, in part at least, were caused by pressure.

In the third case, the tumor was the size of one's fist. It is remarkable

¹ Review of Neurology and Psychiatry, April, 1911, p. 157.

² Journal of Nervous and Mental Disease, August, 1910, p. 465.

that so large a growth could have been present and yet the patient have been able in a degree to attend to his business and ordinary affairs. In this case, also, there was a resemblance to paresis.

Ataxia was present only in one of the three cases. It is by no means a constant sign of prefrontal tumor. Quite frequently a tumor of the frontal lobe has produced symptoms causing, in some instances, a wrong diagnosis of paresis. Thus, one of Dercum's patients was placid and indifferent, and did not manifest any anxiety as to his condition. Another was at times distinctly expansive, good-humored, and not infrequently laughed and joked.

LUMBAR PUNCTURE IN BRAIN TUMOR. Death has occurred rapidly in a number of cases after lumbar puncture performed when brain tumor existed. The explanation usually given is the pressure produced upon the medulla oblongata against the foramen magnum. Marinesco has had the opportunity to examine three cases in which death from lumbar puncture occurred. In two, a hemorrhage was found in the tumor; in the third, a hemorrhage was found in the opposite cerebral hemisphere. In all three cases the symptoms became aggravated immediately after the puncture. The hemorrhages evidently were caused by a change in the pressure of the cerebrospinal fluid.

Schlesinger¹ has had three deaths following lumbar puncture for brain tumor, and yet he has employed it in preference to decompression, as the latter has not always been satisfactory. In one case, dementia followed decompression; in another, aphasia. He has obtained relief of symptoms in a number of cases by lumbar puncture, and he thinks if only a small amount of fluid be allowed to escape at one time the danger is not greater than that from opening the skull. In recent years he has not lost any cases from lumbar puncture, as he has observed this precaution.

APHASIA FROM TUMOR OF THE RIGHT CEREBRAL HEMISPHERE. A few cases in the literature would seem to indicate that occasionally, in right-handed persons, the speech centres are located in the right cerebral hemisphere. One of the most recent cases of this kind is reported by Lewandowsky.² A glioma in the white matter of the right cerebral hemisphere caused paralysis slowly extending from the left lower limb to the left upper limb, disturbance of sensation on the same side, left hemianopsia, and general symptoms of tumor. Sensory aphasia and motor apraxia were present and were not easily explained by this lesion. They might be considered as symptoms at a distance from general increase of intracranial pressure, but the early appearance of these disturbances in the symptom complex would hardly justify this diagnosis, especially as there was no right hemianopsia. The patient was a right-

¹ *Deutsche Zeitschrift für Nervenheilkunde*, vol. xli, Nos. 1 and 3.

² *Zeitschrift für die gesamte Neurologie und Psychiatrie*, vol. iv, No. 2, p. 211.

handed man. It would seem that, in this case, the right cerebral hemisphere had the functional predominance. The motor power of the right upper limb was not impaired.

ABDUCENT PALSY IN BRAIN TUMOR. The paralysis of the sixth nerve, in cases in which the brain tumor is remote from the nerve, has been attributed usually to pressure at a distance. Cushing¹ offers an ingenious explanation of the phenomenon different from that usually accepted. He says in the usual topographical relationship the arteries are superficial and cross the abducent nerves in such a way as to render constriction possible. In the majority of the fatal cases in which diplopia (particularly in association with a conjugate strabismus) had been recorded, the pons was grooved and these nerves were constricted by the arteries; especially is this true in cerebellar cases, though not restricted to them. The cerebellar lesion, though often so remote as to render unlikely any possible direct affection of the nerves themselves or of their centres, nevertheless, owing presumably to swelling and enlargement of the hind brain, produced such a stretching of the arteries around the brain stem as to constrict and groove the nervous tissues, much as though a rubber band had been placed around them. In cases of extreme constriction, the sixth nerves may be found degenerated and replaced by scar tissue at the point of constriction. A convergent squint, if due to arterial constriction of the sixth nerves, may be regarded as one of the general signs of pressure, and as speaking in favor of a lesion of the hind brain.

Cushing attributes the abducent palsies occurring in other conditions than brain tumor to vascular constriction, and finishes his carefully prepared paper by references to arterial constriction of other cranial nerves.

TUMORS OF THE THIRD VENTRICLE. Weisenburg² believes that tumors within the third ventricle, growing either from the ependymal walls or the choroid plexus, are uncommon. He has collected the reports of thirty cases. Tumors within the third ventricle, he finds, have a tendency to grow in the direction of the flow of the cerebrospinal fluid, that is, toward the fourth ventricle through the aqueduct of Sylvius. Internal hydrocephalus nearly always occurs either because of interference with the flow of the fluid or of interference with the function of the choroid plexus. Growths within the third ventricle do not cause specific symptoms, and their recognition depends entirely upon the symptoms of pressure on the surrounding structures.

TUMOR OF THE TEMPORAL LOBE. The diagnosis of tumor of the right temporal lobe is usually made with much uncertainty. In illustration may be mentioned a case reported by A. Ulrich.³ A girl, aged fourteen

¹ Brain, 1910, Part 130, vol. xxxiii, p. 204.

² Ibid., p. 236.

³ Deutsche Zeitschrift für Nervenheilkunde, vol. xl, Nos. 1 and 2, p. 1.

years, had attacks of pronounced hallucinations of hearing during two years. She heard her name called. These attacks were associated with severe headache and constipation. At the age of sixteen convulsive attacks occurred, consisting of turning of the head and eyes toward the left. One year later general convulsions developed, predominating, however, on the left side. Papilledema and tinnitus aurium were among the later symptoms. Operation was performed over the left cerebellar lobe, on account of a mistake in localization. A tumor was found at necropsy in the right supramarginal gyrus, and was associated with much internal hydrocephalus.

A collection of cerebrospinal fluid formed constantly at the site of operation, and was removed by puncturè daily during several months. Evacuation of this fluid was necessary for relief of symptoms.

The important localizing symptoms in this case were the early aural hallucinations and attacks of deviation of the head and eyes to the left.

DYSCROMATOPSIA IN TUMOR. Camp¹ has made a study of the interlacing of the color fields to determine the diagnostic value of this sign in relation to brain tumor. He concludes that as dyschromatopsia (interlacing and reversal of the fields) occurs in both organic and functional nervous diseases, its presence is of little aid in differentiating between them. There is some reason to believe that dyschromatopsia might be valuable in distinguishing between the different functional conditions. It occurs frequently in hysteria, and apparently does not occur in the other neuroses unless they are complicated by hysteria. It might be of value in the differential diagnosis of hysteria from neurasthenia, Graves' disease, idiopathic epilepsy, psychasthenia, and some of the psychoses—all conditions which are frequently mistaken for hysteria. He has not found inversion or interlacing of the color fields in cases of multiple neuritis or in retrobulbar neuritis, though either might occur, as it has been observed in various intoxications, and the latter may cause multiple neuritis. Dyschromatopsia is frequently found in tabes, and Camp has not observed it in other affections of the spinal cord. He thinks it occurs with brain lesions if these are generalized, but not from strictly localized lesions, and the general lesions may be circulatory, inflammatory, or traumatic in origin. When it occurs with brain tumor it has no localizing value.

TUMOR OF THE OPTIC THALAMUS. Particularly interesting in a case of tumor of the optic thalamus, reported by Weisenburg and Guilfoyle,² was paralysis of the lower part of the face, of the muscles of mastication, and of the tongue, on the side opposite to the tumor. No weakness of the limbs could be detected. This is a remarkable combination of symptoms from a lesion in or near the internal capsule.

¹ Journal of Nervous and Mental Disease, June, 1911.

² Review of Neurology and Psychiatry, June, 1910, p. 325.

TUMOR OF THE CEREBELLOPONTILE ANGLE. A successful removal of a tumor from this region is reported by Josefson,¹ but the patient's condition does not seem to have been improved. In a second case of the same character the operation resulted fatally.

HYDROCEPHALUS SIMULATING TUMOR. When hydrocephalus develops in adult life, and at a time when the bones of the skull are firmly united, the symptoms may suggest brain tumor. The pressure from the brain upon the vault of the skull may be so great as to cause atrophy of the inner table in areas corresponding to the convolutions. By means of some x-ray plates taken by C. L. Leonard, it has been shown, in an article by me,² that these atrophic areas may be detected and a diagnosis between brain tumor and hydrocephalus may be possible.

TUMOR OF THE PITUITARY BODY, FRÖHLICH'S DYSTROPHY. By Fröhlich's dystrophia, adiposogenitalis, is meant a condition of general adiposity, genital atrophy, and a series of trophic changes associated with pathological changes of the pituitary body or structures in its immediate neighborhood. As Eason³ says, the adiposity is frequently pronounced in the breast and abdomen. The normal exhibition of hair is lacking, especially on the face, in the axillæ, and over the pubis. The skin is dry, and the nails are brittle or fragile. The persistence of the childish habitus occurs only when the morbid process has begun before adult life is reached. If the disease begins after puberty, there is a tendency to the loss of the secondary sexual characteristics, and the condition is to be distinguished from that of true infantilism. In the latter, these secondary sexual characteristics are never or only imperfectly developed.

Eason reports a case of the Fröhlich type and emphasizes the striking similarity of its features to those produced in dogs by the removal or partial removal of the anterior lobe of the pituitary body. The points of similarity are: Low temperature, apathy, somnolence, polyuria, asthenia, adiposity, atrophy of testicles, diminution of secondary sexual characteristics, hypotrichosis, and narrow, tapering extremities. Remarkable in Eason's case was the great improvement resulting from the oral administration of a preparation of the whole pituitary gland. The headache, giddiness, apathy, somnolence, and asthenia disappeared; the temperature tended to be higher; the hair growth became stronger on the lips and in the axillæ, and the polyuria was very greatly reduced. Whether the lesion was tumor or not is uncertain; several x-ray photographs, however, showed an abnormally shaped sella turcica.

MENINGITIS SEROSA SIMULATING PITUITARY TUMOR. That meningitis serosa in its symptomatology may resemble brain tumor is well

¹ Deutsche Zeitschrift für Nervenheilkunde, vol. xxxix, Nos. 5 and 6, p. 468.

² Review of Neurology and Psychiatry, January, 1911, p. 8.

³ Ibid., August, 1910, p. 474.

known, but Kurt Goldstein¹ attempts to show from clinical cases that it may resemble tumor of the pituitary body. In meningitis, however, the signs of disturbed pituitary function are slight in comparison with those of increased intracranial pressure; this is because in meningitis these signs are secondary. Choked disk is common in the acute stage of meningitis serosa, whereas in pituitary tumor no alteration of the eye ground is seen at first, and later optic atrophy is more likely to occur than choked disk. It is not easy to determine, in late stages, whether optic atrophy is primary, or secondary to choked disk. Bitemporal hemianopsia, so common in the tumor form, is uncommon in meningitis serosa; whereas in the latter, central scotoma and contraction of the form fields are found. They are caused by the diffuse pressure of the distended infundibulum upon the chiasm. A pressure from above is believed to affect first the decussating papillomacular bundles.

The pituitary symptoms observed in Goldstein's cases were: Development of fat, atrophy of the genitalia, arrest of body growth, and certain manifestations of acromegaly. In cases of pituitary tumor in young persons, the body growth is usually increased.

This attempt of Goldstein to demonstrate the occurrence of pituitary tumor symptoms from the pressure of a distended infundibulum in meningitis serosa is important, but it would be well to remember, that he had only clinical cases; that, especially in tumors of the pituitary body, the symptoms may develop very slowly; and that tumor may be combined with hydrocephalus.

Brain Syphilis. In a paper read by Horsley² at the last meeting of the Society of German Neurologists, on the surgical treatment of brain tumor and syphilis, the most interesting statements probably are those in regard to syphilis. Our present methods of treating syphilis of the nervous system should be changed. Horsley has obtained the most speedy results by opening the subdural space and washing it out with 1 to 1000 bichloride solution. Pachymeningitis and endarteritis may be advantageously treated in this way. Horsley says he has employed this treatment in all conditions of cerebral syphilis, viz., acute meningitis, chronic pachymeningitis, chronic cerebritis, and gumma, and without danger. This treatment will cause a disappearance of syphilitic optic neuritis more quickly than any other, and with permanent recovery so far as he can tell. In all cases of syphilitic cerebrospinal disease, this irrigation method with bichloride solution is the treatment of choice.

In this paper Horsley refers to the observation first made by him, that simple decompression may cause a glioma to disappear entirely.

Swelling of the Brain. Enlargement of the brain, as stated by M. Reichardt,³ may occur in different ways. It may be from free fluid in

¹ *Archiv für Psychiatrie*, 1910, vol. xlvii, No. 1, p. 126.

² *Neurologisches Centralblatt*, November, 1910, p. 1170, and *British Medical Journal*, December 10, 1910, p. 1833.

³ *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 1911, vol. iii, No. 1, p. 1.

the spaces of the brain, or from a demonstrable increase of histological elements. Such enlargement, in strict sense, is not the brain swelling, which Reichardt especially has studied. Cerebral hypertrophy also is a different condition. The true swelling may develop very rapidly and disappear equally quickly. The true brain swelling cannot be explained by hypertrophy, hyperplasia, inflammatory changes, swelling from hyperemia or free fluid, or by histological findings. In certain cases, acutely developing symptoms were present when, after death, the true brain swelling was found; possibly the latter is the cause of the former. The amount of fluid in the brain varies greatly in the brain swelling.

The cause of this swelling is uncertain; it is not a disease *sui generis*. It is possible that an intimate combination of fluid with the brain substance occurs, but the brain need not appear unusually moist, and the condition is not recognizable by the microscope. It may be one of the causes of pseudotumor, in which condition the symptoms of brain tumor occur but no tumor is found. The true swelling of the brain, as described by Reichardt, is rather a puzzling condition, and one which has not received much attention except by the author and a few others.

Aphasia. CONGENITAL WORD BLINDNESS. Hinshelwood, in 1907, reported the occurrence of congenital word blindness in four members of the same family, the youngest members of this family. He¹ now reports two more cases, in the children of the oldest daughter of this same family. The mother of these children never experienced any difficulty in learning to read. She has six children, and the other four members of the family have learned to read without any special difficulty.

Hinshelwood says that all of the many persons with congenital word blindness he has seen have ultimately been taught to read. He means by this term, cases in which this defect exists alone in an otherwise healthy and normal brain. Cases of inability to learn to read associated with general defective intelligence and defect of other cerebral centres belong to another category, and in these the prognosis is not so hopeful. Pure word blindness, which is the result of a local disturbance in a limited cerebral area can, he thinks, always be overcome by perseverance and proper methods of education, and herein lies the great importance of the recognition at an early period of the true character of such cases. Homonymous hemianopsia, which is so frequently associated with acquired word blindness, has never been met with in a case of congenital word blindness; this indicates that in the latter condition there has been no disease or injury at birth, but a defective development of a definite area, probably the left angular gyrus.

Hydrocephalus. Puncture of the fourth ventricle in internal hydrocephalus has been discouraging in several cases in which it has been

¹ British Medical Journal, March 18, 1911, p. 608.

tried, but in an article by Bruce and Stiles a case is described in which the operation was followed by relief for ten days. In this case, there was excessive escape of cerebrospinal fluid. In the same paper fifteen other cases are referred to, in which the foramen of Majendie was opened, in five instances with a successful result. Bruce and Cotterill¹ now report a case which shows that the prognosis is by no means so hopeless as one would gather from the existing literature, and from the opinion prevailing among physicians and surgeons.

The practically complete recovery which followed the operation for hydrocephalus following meningitis is an indication, in the opinion of the authors, that the operation is not only justifiable, but one which ought to be recommended. They consider necessary the removal of a large portion of the occipital bone and of the posterior border of the foramen magnum. The free access to the roof of the fourth ventricle and the adjacent parts thus obtained enabled the adhesions to be easily dealt with, and also probably permitted the reopening of channels of escape for the cerebrospinal fluid into the subarachnoid spaces, which could not have been so easily established through a small opening.

Hemiplegia. **RECURRENT ATTACKS.** Recurrent attacks of hemiplegia occur occasionally, but seldom with the frequency observed by Riebold.² One of his patients who had tabes, a man, aged fifty-six years, at first had his attacks of hemiparesis at long intervals, but later they became almost daily, and yet only after exertion, as in climbing steps. They began with a sensation of vertigo followed by partial unconsciousness. After a few minutes consciousness returned, and the right side of the face and the right upper and lower limbs were paralyzed, and paresthesia and pain developed in these limbs. Speech was difficult during the attack. Complete recovery occurred after one to three hours. The cause was supposed to be syphilitic endarteritis of the left Sylvian artery, or meningitis about this artery; the attacks were arrested by antisyphilitic treatment. Inasmuch as the attacks occurred only after exertion, obstruction in the vessel to the flow of blood was supposed to exist. Attacks such as those observed in this case occur in paresis, and may in this disease likewise be caused by partial vascular occlusion. Temporary hemiplegia in persons with cardiac disorders is attributed by Riebold to embolism of a small cerebral vessel. An embolus at first may entirely occlude a vessel, and later may be pushed forward so as to leave the entrance to important branches free, and in this way a hemiplegia may disappear. He assumes that occasionally anastomosis may exist between larger branches of cerebral arteries, especially of the Sylvian artery.

¹ Review of Neurology and Psychiatry, January, 1911, p. 1.

² Münchener med. Wochenschrift; 1910, No. 20, p. 1063.

NÉRI'S SIGN. Néri has described a new sign in hemiplegia. A hemiplegic who is able to stand is told to bend forward, when his lower limbs are separated and held straight, and the upper limbs are folded across the chest. When the trunk has become almost horizontal the lower limb on the paralyzed side flexes to a certain degree, while the other limb remains straight. Néri has attributed this phenomenon to the hypertonicity of the flexors.

Sainton¹ shows that this new sign is nothing more than Kernig's sign obtained in a different way, and he refers to the fact that the latter has been observed in hemiplegia. Kernig's sign may be sought by having the person seated and extending the leg on the thigh, or by flexing the thigh on the abdomen when the leg is extended on the thigh and the person is lying down, or by Néri's method described above.

BABINSKI'S REFLEX IN HEMIPLEGIA. Byrom Bramwell described, in 1903, a condition which he called crossed plantar reflex; irritation of the paralyzed sole produced extension of the big toe on the paralyzed side, while irritation of the non-paralyzed sole produced plantar flexion of the big toe not only on the sound, but also on the paralyzed side.

In another case, irritation of the paralyzed side produced extension of the big toe on that side, and irritation of the non-paralyzed sole also produced extension of the big toe on the non-paralyzed side. A double crossed plantar reflex was present and was of the flexor type. Irritation of the paralyzed sole produced flexion of the big toe on the non-paralyzed side, and irritation of the non-paralyzed sole produced flexion of the big toe on the paralyzed side.

In still another case, irritation of either sole produced extension of the great toe on both sides, and there was a bilateral crossed extensor response. Bramwell's² conclusions in brief are:

1. In a considerable number of cases of hemiplegia in which there is an extensor response on the paralyzed side, a flexor response on the paralyzed side can be elicited by irritation of the opposite (non-paralyzed) sole.

2. In some (rare) cases of hemiplegia in which a double extensor response is present, a double flexor response can be elicited upon irritating either sole.

3. In some (rare) cases in which a double extensor response is present (as the result of an injury to the upper part of the lumbar enlargement of the spinal cord), a double extensor response can be elicited upon irritating either sole.

In a case of brain tumor of small size, reported by Potts and Weisenburg,³ the location of the growth was the right precentral convolution. When the patient was admitted to the hospital he had weakness only

¹ *Revue Neurologique*, May 30, 1910, p. 618.

² *Review of Neurology and Psychiatry*, February, 1911, p. 49.

³ *Ibid.*, October, 1910, p. 577.

in the left upper limb, and later the left side of the face became implicated. At first the left knee-jerk was slightly increased, the Achilles jerk being normal; the plantar reflex was sluggish and the toes flexed. Gradually hypertonicity of the left lower limb developed, and the great toe of each foot assumed a position of hyperextension, the other toes were extended at the first phalanges with the exception of the second and third, which were flexed. A little later the left lower limb was observed to be weaker than it had been, and irritation of the plantar surface caused dorsal flexion of the great toe for the first time.

From these observations the authors argue that the Babinski reflex occurs only in those cases in which the fibers for the lower limb are implicated.

HEMIPLEGIA AFTER INFECTIOUS DISEASES. It is well known that hemiplegia occasionally develops in acute infectious diseases. Jones and Hamilton¹ have studied two cases in which the paralysis followed diphtheria, probably from a central lesion, although in one case there may have been both a central and a peripheral lesion. It was impossible to say whether it was acute encephalitis or not. In another case, hemiplegia developed in a child, aged four years, ill with lobar pneumonia. As the authors state, paralysis either of central or peripheral origin is rare in the course of pneumonia.

BENEDIKT'S SYNDROME. A symptom complex, known by the name of Benedikt, is hemiplegia with tremor on the side of the paralysis and oculomotor palsy on the opposite side. Mills² reports a case of this character, except that the ocular palsy was not present. He places the lesion in the region of the superior cerebellar peduncle.

Tremor resembling that of paralysis agitans and developing after a lesion of the cerebral peduncle, is a condition that is worthy of further study.

Babinski's Sign in Diphtheria. Rolleston³ has made a study of the Babinski sign in diphtheria. He found it in a considerable percentage (19.6 per cent). of all cases, the character of the response being rapid, deliberate, or intermediate in character. It was present not only in children, but also with decreasing frequency and duration, especially after the eighth year until adult life. It is essentially a phenomenon of the acute stage, in most cases being replaced by flexion in convalescence. Transition stages often exist in which various forms of response may be obtained. The sign, he thinks, is not pathognomonic of diphtheria among the acute infections, since it occurs in typhoid fever, scarlatina, lobar pneumonia, and probably other acute diseases; but its greater frequency in diphtheria than in non-diphtheritic angina accords it a certain diagnostic value. It is more frequent and persistent

¹ Journal of the American Medical Association, October 8, 1910, p. 1247.

² Annals of Ophthalmology, January, 1911.

³ Review of Neurology and Psychiatry, July, 1910, p. 404.

in the severe than in the mild forms of diphtheria, as is shown by the character of the angina, the higher mortality, and greater frequency of paralysis and albuminuria among the cases in which it occurs. Its presence has therefore a certain prognostic value. It is not associated with any special condition of the tendon jerks, and is never accompanied by ankle clonus. It is probably caused by a transitory perturbation of the pyramidal system by the circulating toxins, comparable to the slight degree of meningeal reaction which is a frequent occurrence in acute infections.

Leukemia. The changes occurring in the nervous system in leukemia are numerous. In the acute cases, microscopic or even macroscopic hemorrhages are not uncommon; sometimes accumulations of white blood corpuscles are found about the vessels or nerves, or elsewhere within the nervous tissues. Baudoin and Parturier¹ report a case of leukemia with nervous symptoms in which a necropsy was obtained. Progressive weakness of the lower limbs and pain were explained by a diffuse myelitis, and rapidly developing paraplegia by an area of softening at the sixth thoracic segment.

Conjugate Deviation in Cerebellar Lesions. I² have recently had an opportunity to study a case which has important bearing on the subject of cerebellar conjugate deviation, and affords evidence that an irritative lesion of the cerebellum in man as well as in the dog causes turning of the head and eyes toward the lesion. It was one of small hemorrhage in the left lateral cerebellar lobe, which did not implicate the intrinsic nuclei of the cerebellum, *i. e.*, the nucleus dentatus, nucleus fastigii, and nucleus emboliformis vel globosus. Another hemorrhage destroyed the right basal ganglia of the cerebrum, and there can be little doubt that so extensive a lesion as this was of a paralyzing character, so far as conjugate deviation was concerned. Inasmuch as the head and eyes were turned to the left, the side of the irritating hemorrhage in the cerebellum, and were turned away from the paralyzing hemorrhage of the cerebrum, the case shows that the symptoms produced by irritation of the intrinsic cerebellar nuclei predominated as regards conjugate deviation over those caused by a destructive lesion of the cerebrum, and that the conjugate deviation from irritation of these nuclei was toward the lesion.

Amaurotic Family Idiocy. The infantile form of this disease has been so well studied clinically and pathologically, that not much further knowledge can be expected. This cannot be said of the juvenile form, which by some has been regarded merely as a late appearance of amaurotic family idiocy, by others as a distinct disease. Necropsies have been rare in the juvenile type. A case of the latter is now reported by

¹ *Revue Neurologique*, June 15, 1910, p. 673.

² *Review of Neurology and Psychiatry*, July, 1910, p. 397.

T. Rogalski,¹ and although he obtained only the brain, and could not employ the fibril method, he concludes that this case in its anatomical changes in the nervous system resembled closely the Tay-Sachs' disease.

During the lifetime of the patient, the diagnosis lay between idiocy with amaurosis and juvenile paralysis. Little was known in Germany at that period concerning amaurotic family idiocy, and still less concerning the juvenile form. The child developed normally to the age of seven years. At about the tenth year, blindness began from optic atrophy; about the thirteenth year disturbance of speech and gait appeared; a year later epileptic attacks developed, then nystagmus. These symptoms progressed slowly, and the patient became blind, demented, spastic, paralyzed, and dumb, and died at the age of twenty-six years in great marasmus.

The peculiar macular changes have not been present in the juvenile type, and were not in this case. Rogalski thinks that the character of the cellular changes in his case resembles more that of the infantile form than that of the published cases of the juvenile type, and that the difference was caused by the chronicity of the process and by the more resistance of the tissues on account of the greater age of the patient.

In examining the drawings accompanying Rogalski's article, one fails to find the peculiar and intense swelling of all the nerve cells so characteristic of amaurotic family idiocy, and he cannot but conclude that there is still some doubt regarding the acceptance of the infantile and juvenile forms as different types of the same disease, especially as the remarkable macular changes do not occur in the juvenile type. One will admit, however, that there is some resemblance in the cellular alteration of the two types.

Meningitis. Bruce and Shennan² remark that the direct invasion of the leptomeninges of the brain and spinal cord in man by the anthrax bacillus is apparently of comparatively rare occurrence. The description of the hemorrhagic form of meningitis, which seems to be the principal consequence of such an invasion, has hardly found its way even into the recent text-books of medicine and of neurology. The possibility of its occurrence may therefore not suggest itself to the physician who has to deal with the early stages of the cutaneous infection, which may appear to be of little consequence, at the only time when treatment is likely to be of service in saving the patient's life. This fact, the dramatic rapidity with which the disease develops, the striking character of its symptoms, and the valuable aid to diagnosis that may be rendered by lumbar puncture, seem to the authors to warrant the publication of a typical case of hemorrhagic meningitis caused by the anthrax bacillus.

¹ Archiv für Psychiatrie, vol. xlvii, No. 3, p. 1195.

² Review of Neurology and Psychiatry, September, 1910, p. 521.

They have collected a surprisingly large number of similar cases. They state that when a cutaneous lesion shows the characters of a typical malignant pustule and is unaccompanied by great edema and swelling, the likelihood of a general infection taking place, with a fatal result, is diminished; and the prognosis is still better if the primary lesion develops on the extremities, in the nape of the neck, or in parts which are made up of fairly dense tissue in which swelling cannot readily take place.

EARLY SYPHILITIC MENINGITIS. Symptoms of implication of the central nervous system within three or four months after the primary infection are not common, and only a few cases of this kind are recorded. In a case reported by Stursberg,¹ the diagnosis of syphilis in the secondary stage seemed positive, cerebral symptoms (hemiplegia, convulsions, etc.) developed, and death occurred within half a year after the appearance of the primary lesion. The necropsy showed extensive leptomeningitis, small areas of softening in both cerebral hemispheres, and hyaline degeneration of the media in some of the vessels; these changes were regarded as syphilitic.

Localization. An important investigation of Economo² has thrown light upon the position of the fibers of temperature and pain in the pons. From a case in which a tubercle developed in the left side of the tegmentum of the pons, he has shown that the fibers for the sensations mentioned must be lateral to the sixth nerve and in the lateral part of the median fillet, whereas the fibers of touch and deep sensation must be chiefly in the median part of the median fillet between the sixth nerve and the raphe.

Pain produced by a cerebral lesion he has shown may result from implication of the fibers of pain below the optic thalamus.

These are important conclusions, and mark a distinct advance in our power of cerebral localization.

Sensation. Under the term "*monesthesia*," as applied to temperature sensations, is understood by Newmark³ a condition in which, in a definite area, stimuli of different temperatures equally excite in the patient the sensation of warmth. Whether the stimulus be cool, cold, warm, or hot, the effect produced is the same unvarying sensation.

Newmark remarks that in diseases of the cord various forms of dissociation and perversion of sensation have been described, but he has not found any description of a disturbance of thermal sensation just like that studied by him. In lesions of the medulla oblongata, such disturbances have been observed.

It is probable that this peculiar disturbance of sensation has been seen by many and yet not reported. I am sure I have seen it several

¹ Deutsche Zeitschrift für Nervenheilkunde, vol. xxxix, Nos. 5 and 6, p. 459.

² Jahrbuch. für Psychiatrie und Neurologie, vol. xxxii.

³ Journal of Nervous and Mental Disease, February, 1911, p. 88.

times. Newmark deserves credit for calling attention to it. He does not discuss the pathology of the disorder in the absence of anatomical data. He puts his case on record chiefly because it is one of "thermo-monesthesia" in a disease of the spinal cord. In the rare instances in which it has been recorded, the lesion probably was in the medulla oblongata.

Central Deafness. Bilateral deafness from cerebral lesions is seldom recorded. M. Allen Starr¹ has studied a case during a period of eight years, in which slight right hemiplegia and aphasia developed but rapidly subsided. About a year later a second apoplectic attack occurred, more severe than the previous one, and permanent symptoms remained until death, eight years later. The right side of the face and the left upper and lower limbs were paralyzed, from which it may be concluded that the lesion was in the pons. Sensation was much impaired, but the sensory changes need not concern us greatly. More important is the statement that from the day of the attack until death the patient was totally deaf in both ears. The deafness was complete for all sounds, high or low, and there was no bone conduction of sound. A very loud bell rung behind her caused a sense of uneasiness, so that she would move her body restlessly and become aware that something disagreeable was happening. This was evidently felt as vibration, because it was not referred to the ears and was not heard. There was no disease of the ears.

Starr has collected the reports of a few cases of central deafness in the literature, and from these and from his own case he concludes that deafness may be produced by a lesion in the pons, that it will be on the side of the lesion if the acoustic nerve be affected, that it will be bilateral if the trapezoid fibers be involved at their decussation in the raphe, and that it will be on the side opposite to the lesion if the superior olive and the lateral part of the lemniscus be affected in the pons.

Concussion of Brain. A case reported by A. R. Allen² is interesting, in that concussion of the brain produced visual disturbances. A child, aged six and one-half years, fell while running on a porch, striking the left side of his head. The nurse stated that after he fell he got upon his feet immediately and cried lustily. He had not walked far before he said, "I can't see anything but sky." Allen, ten minutes after the accident, found total blindness in both eyes for both form and light. A lighted candle held 25 cm. from the eyes in a darkened room gave no visual impression of light. Both patellar reflexes were greatly exaggerated and the lower limbs were spastic. Babinski's sign was elicited on the left side. Breathing was deep and sighing. There were no other important symptoms. One hour after the first examination the child thought it was a little brighter when the candle was placed 25 cm. in

¹ Journal of Nervous and Mental Disease, July, 1910, p. 401.

² Journal of the American Medical Association, September 10, 1910, p. 945.

front of his eyes. A half hour later he called a lighted candle a lighted match. Three hours after the first examination he was able to distinguish objects and people with great precision.

The rapid disappearance of the blindness in this case was remarkable. A similar case has been reported recently by Hirsch, of Prague.

Alcoholism. The treatment of delirium tremens is a subject of practical interest, and one concerning which different opinions are held. Ranson and Scott¹ have written a paper based on the study of 1106 cases, in which they give their views. The enormous doses of hypnotics usually employed are often without effect, or if a short sleep be produced the patient awakens from it with unabated delirium. When the disease has run its course the patient falls into a profound sleep, from which he awakens more or less in a normal condition. It is doubtful whether this sleep can be induced by hypnotics, and those usually used have proved so dangerous that by many the use of all these drugs has been abandoned, although some recommend their use. The effect of *chloral* upon delirious patients these authors found unfavorable, the mortality in the 183 cases in which it was used being 2.7 per cent. higher than in the 322 cases in which it was not used. Its effect on the circulation more than counterbalanced any good it did. It was of more service in incipient delirium tremens. Of the 112 patients in this stage treated with chloral, only 25 per cent. became delirious; while of the 590 not so treated, 41.3 per cent. developed delirium. It therefore possesses a marked influence in preventing the disease from passing from the first into the second stage.

The results obtained by the *bromides* and *paraldehyde* were similar to those of chloral. *Morphine* and *opium* are useless and dangerous. Morphine in delirious patients increased the mortality more than chloral, paraldehyde, or the bromides; and in the incipient cases it had little if any effect in warding off the stage of delirium. *Hyoscine* is more dangerous than morphine.

Of the 66 cases in the second stage receiving *veronal*, 14 died, or 21.2 per cent., while of the 138 not receiving it, 52 died, or 37.6 per cent., making a decrease in the mortality of 16.4 per cent. Veronal was also superior to the other hypnotics in its action on the incipient cases. Of 91 such cases treated with this drug, 13 became delirious, or 14.3 per cent., while of the 266 not so treated, 114 became delirious, representing a decrease due to veronal of 28.5 per cent. According to Köhler, it is possible to produce a pronounced sedative effect on the nervous system with veronal without producing any disturbance of the circulation, and all recorded cases of veronal poisoning are said by Porter to have shown that it does not depress the circulation.

Of 217 delirious patients who received *whisky* in ounce doses four to

¹ American Journal of the Medical Sciences, May, 1911, p. 673.

six times daily, 83 died, or 38.2 per cent., while of 288 such patients not so treated, 115 died, or 39.9 per cent. The mortality was thus 1.7 per cent. less when alcohol was given. The authors believe these results render the question whether alcohol should be given to delirious patients one which is decidedly open to discussion, and not as most writers would have us believe, settled against the use of alcohol. They think alcohol should never be withdrawn from cases of incipient delirium tremens. Of 202 such cases on alcohol, 49, or 24.3 per cent., became delirious, while of 500 similar cases deprived of alcohol, 44.6 per cent. became delirious, or 20.3 per cent. more. This, they think, clearly shows that while the withdrawal of alcohol may not of itself be sufficient to bring on an attack of delirium tremens in a chronic alcoholic, yet when from other causes the patient is already in the incipient stage, the withdrawal of alcohol greatly increases the chances that he will become delirious.

In regard to *ergot*, of 167 delirious patients on ergot, 48, or 28.7 per cent. died, while of 338 similar cases not on ergot, 150 died, or 44.3 per cent. It thus appears that the use of ergot decreased the mortality 15.6 per cent. It is equally beneficial in the incipient cases, since only 19.2 per cent. of the cases receiving it developed delirium, as compared with 46.9 per cent. among those not getting it. These results were obtained by the administration of ergot by mouth, the usual dose being one dram of the fluidextract repeated every four hours.

These authors conclude that the medicinal treatment of delirium tremens is more effective in the first than in the second stage of the disease. Incipient cases should receive large doses of the hypnotics, of which veronal is by far the best; whisky should be given regularly, and ergot administered at frequent intervals either by intramuscular injection or by mouth. Such medication should be discontinued gradually, and only after all signs of restlessness and tremor have disappeared. The delirious patient should receive veronal in moderate doses and all other hypnotics should be withheld. Ergot should be given as in the incipient cases. It is not certain whether delirious patients should receive whisky regularly or not.

DISEASES OF THE SPINAL CORD

Tabes. Redlich's¹ statements concerning tabes are always interesting, inasmuch as he is one of those who have devoted much attention to this disease. In 39 cases of tabes in which the Wassermann reaction was taken, he obtained positive results in 27, *i. e.*, in about 70 per cent. of his cases. His percentage figures agree with those of most investigators. It seems remarkable that in paresis, so nearly related to tabes, the positive results are obtained in 95 to 100 per cent. of the cases.

¹ Wiener med. Wochenschrift, No. 51, 1910.

It is important to determine whether thorough treatment with mercury will lessen the danger of tabes and paresis. In 308 cases of tabes studied by Redlich, 125 (40.9 per cent.) never received any mercury; 80 (26 per cent.) were imperfectly treated with mercury; 44 (14.3 per cent.) were uncertain; so that in 81.2 per cent. of his cases proper mercurial treatment had not been employed. In 57 (18.8 per cent.) mercury had been given in proper amounts. He therefore concludes that syphilitic persons not treated or improperly treated with mercury run more danger of becoming tabetic or paretic than those who have received proper amounts of mercury, but even the most thorough mercurial treatment does not positively prevent the development of tabes. Redlich has employed mercury in all acute cases of tabes, but not in advanced cases, and he believes it may arrest the progress of the disease, although in some cases it has no effect. So far as his material permits him to form a judgment, "606" has not accomplished much in the treatment of tabes.

APPENDICITIS IN TABES. It is well known that a tabetic person is exposed to dangers that a well person may escape. He may receive a fracture of the jaw from the pulling of a tooth, or of a limb from a slight trauma, but it is especially interesting to recall that when sensation is affected, inflammation may escape detection, even acute appendicitis or peritonitis. In illustration of this fact, Lewis A. Conner,¹ reports a case of mild tabes which he has observed, in which acute appendicitis developed, progressed to perforation and a diffuse peritonitis, and ended in death, without there having been at any time spontaneous pain, tenderness, or protective muscular rigidity. Conner remarks that instances of the almost complete absence of these three symptoms in the peritonitis which follows the perforation of a typhoid ulcer are not very rare, but they occur only in patients showing profound prostration and apathy as a result of the severe intoxication of the primary disease. In the case observed by Conner, the appendicitis developed in a man in his usual health and with an alert mind and a clear sensorium. Under these circumstances the author thinks it can hardly be doubted that the explanation for the absence of these three cardinal symptoms must be sought in the sensory disturbances of tabes.

OCULAR PALSIES IN TABES. It has been generally believed that the third, fourth, and sixth cranial nerves are purely motor. Investigations made by Tozer and Sherrington² make this view improbable. Intracranial severance of both trigeminal nerves in the monkey resulted in no obvious impairment or ataxia of eyeball movements, and severance of both trigeminal nerves, combined with severance of both optic nerves, even after transsection of the encephalic bulb, did not obviously

¹ Journal of the American Medical Association, October 22, 1910, p. 1427.

² Folia Neuro-Biologica, November, 1910, p. 626.

depress the tonus of the extrinsic eye muscles. Since severance of the afferent nerves of muscles does almost universally depress their tonus severely, the inference was drawn that the tonus of the extrinsic eye muscles is not dependent on the trigeminus or opticus, and may therefore be referable to afferents contained within the third, fourth, and sixth nerves themselves.

These investigators concluded that the third, fourth, and sixth nerves contain both efferent and afferent nerve fibers, and they state that degeneration of these nerves in tabes, a disease defined as "primary progressive degeneration of the first afferent (sensory) projection system of neurones," becomes less anomalous in view of these nerves being afferent-efferent, and not purely efferent. The ocular deviations common in tabes may be referable to loss of reflex tonus, owing to degeneration of the proprioceptive afferents rather than to actual paralysis from destruction of the motor fibers of these nerves.

ARGYLL-ROBERTSON SIGN. The Argyll-Robertson phenomenon is recognized as an important sign of tabes, but there is doubt as to its occurrence in syphilitic persons who have not had the symptoms of tabes. Risien Russell, in his remarks on ophthalmoplegia at the meeting of the British Medical Association, asked the questions as to how far persons who have had syphilis and have this pupillary sign have escaped tabes or general paralysis, and whether this sign is compatible with a syphilitic lesion which does not mean a tendency to progressive degeneration. No decisive answers were given to those questions in the discussion that followed.

Mott has made the statement: "There is one sign usually present which for all practical purposes is only met with in parasyphilis—namely, the Argyll-Robertson pupil. No coarse random lesion will explain the constancy of this phenomenon; moreover, this condition, although a sign of syphilitic infection, does not occur in true syphilitic brain disease."

J. Mitchell Clark¹ thinks that the Argyll-Robertson phenomenon is to be regarded as an example of the selective action of a poison upon the central nervous system, inasmuch as a special group of neurones having a definite and restricted function is picked out and put out of action. It may be compared in this respect with the action of the diphtheritic poison in paralyzing accommodation. Clark, in 1903, concluded that previous syphilis is not sufficient without some further change to cause the occurrence of this sign, but that it is reasonable to suppose that the degenerative process may remain stationary at an early stage, or for a long period without further development. He has not changed his opinion expressed at that time, except that he now admits that one or two other conditions may cause the sign, but the associated symptoms should prevent any error of diagnosis.

¹ British Medical Journal, February 11, 1911, p. 296.

GASTRIC CRISES. The appearance of certain symptoms in *tabes dorsalis* in association with gastric crisis, and persisting only during the attack of gastric crisis, has been observed in some cases. Thus, Josefowitsch and Lifschütz¹ report the disappearance of the patellar reflex at the onset of the crisis and its reappearance when the crisis was over. These authors refer to a few similar cases. Loss of patellar and pupillary reflexes, disturbances of cutaneous sensation, and angioneurotic edema have been observed as appearing only during a gastric crisis. Josefowitsch and Lifschütz seek an explanation for these transitory symptoms in Pal's theory of vascular crises (spasms). The latter author has attributed gastric crises to contraction of the smaller vessels of the abdominal viscera, but this contraction may occur in vessels in other parts of the body. Pressure on the posterior roots as they enter the cord, produced in this way, for example, might lead to transitory anesthesia.

Tedesko² has called attention to hematemesis occurring with the gastric crisis of *tabes*, and leading to the diagnosis of gastric ulcer. In one of his cases, laparotomy had been performed twice without any benefit. The explanation given for the hematemesis is that during the gastric crisis the blood pressure is increased. Strümpell also has seen hematemesis occurring in gastric crises.

CUTTING POSTERIOR ROOTS FOR CURE OF GASTRIC CRISES. Thomas and Nichols³ have published the report of a case in which the posterior roots were cut for the relief of gastric crises. As they say, the first case in which this operation was performed for this purpose was one under the care of Foerster and Küttner. The seventh to the tenth thoracic roots inclusive were cut. The pain and vomiting disappeared after the operation, the appetite became good, and the man gained 2 kilograms a week.

A second case was reported by Bruns and Sauerbach. The seventh to the ninth thoracic roots inclusive were cut. Following the operation the patient had had one slight attack of pain after drinking sour milk, but no other trouble.

Thomas and Nichols state that in their case the time that had elapsed since the operation was too short to permit them to form any conclusion regarding the final result. They think that on theoretical grounds it may be that the operation is useless, from the fact that the nervous influence of the disease upon the stomach may take place only through the vagus, but the result in the two previous cases would seem to make this improbable. It may be that the path of the nervous influence producing gastric crises may not be the same in all cases, and in that event no resection of the appropriate dorsal nerve roots may be of

¹ Deutsche Zeitschrift für Nervenheilkunde, vol. xl, Nos. 5 and 6, p. 464.

² Semaine Médicale, June 29, 1910, p. 312.

³ Journal of Nervous and Mental Disease, October, 1910, p. 593.

value in some cases and not in others. In their case, epigastric pain was absent after the operation, but vomiting occurred occasionally. They think the latter may have been the result of accidental causes or of the attempt to diminish the dose of morphine.

The operation is one of distinct promise in the treatment of this extremely troublesome and severe symptom of tabes, and one well deserving the attention of neurologists, surgeons, and internists, but on account of the severity of the operation not to be lightly advised in all cases of gastric crises. It should be reserved for the more severe cases, at least for the present, in which relief by other method has not been obtained. It should certainly be considered in all cases in which the severity of the attacks has been such that the patients are forced to the use of morphine for relief, even when the attacks do not occur with great frequency, in order to prevent the formation of the drug habit, a thing which is likely to happen where morphine gives relief of symptoms when other drugs have failed.

JUVENILE TABES. There has been a fairly large number of clinical cases of tabes in young persons reported, and to this number Malling¹ adds three cases and one with necropsy, the first reported in literature. The last case is regarded by him as typical both clinically and pathologically, and it demonstrates clearly that tabes may occur in the young. The view has been held previously that all these cases of juvenile tabes are really spinal syphilis.

Paresis in the Young.—Juvenile paresis differs in certain clinical and pathological respects from the paresis following acquired syphilis. Strüssler² believes that paresis developing from hereditary syphilis is found with developmental defects of the central nervous system, especially of the cerebellum. This form of paresis presents clinical and anatomical resemblances with the hereditary diseases of the cerebello-spinal system, viz., hereditary cerebellar ataxia of Marie and the juvenile form of amaurotic family idiocy. They all depend on defective development of the central nervous system, and therefore juvenile paresis is to be reckoned with the hereditary diseases. It may develop after the thirtieth year of life.

WASSERMANN REACTION. Nonne³ has given much attention to the Wassermann reaction. This reaction has great value in diagnosis where the symptoms of paresis are not sharply defined. He concludes that a positive Wassermann reaction of the cerebrospinal fluid is more important in a diagnosis of paresis than an increase in the lymphocytes or the globulin of this fluid. When lumbar puncture cannot be performed, the quantitative Wassermann reaction of the blood is of much importance, and in many cases diagnostic.

¹ *Monatsschrift für Psychiatrie und Neurologie*, vol. xxviii, No. 4, p. 304.

² *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 1910, vol. ii, p. 30.

³ *Festschrift*, P. G. Unna, 1910.

He¹ emphasizes that a positive Wassermann reaction obtained from the blood proves only that the patient has had syphilis. A positive Wassermann obtained from the cerebrospinal fluid means that the organic nervous disease is syphilitic. In tabes and cerebrospinal syphilis the reaction of the cerebrospinal fluid usually is negative, but Hauptmann has shown that if sufficient of this fluid (1 c.c.) is used, the reaction may be positive.

A positive reaction in blood serum is a strong evidence that the individual has had syphilis, according to Sarbo and Kiss.² The positive reaction is not specific, it may be obtained in the serum of those with chronic alcoholism, therefore it may be found in pseudotabes and pseudoparalysis alcoholica. The husband or wife of a person with parasyphilis (tabes, paresis) or of one who has had syphilis, or the offspring of these persons, gives a positive reaction in a large proportion of cases, even without presenting other signs of disease. Persons who have once contracted syphilis are liable to give a positive reaction, even when they appear to be healthy. Therapeutic or prognostic deductions should not be made from the reaction alone. Antiluetic treatment has little effect on the positive reaction in nervous disease; indeed, a negative reaction obtained after vigorous treatment may become positive within a short time.

Plaut³ states that it is the rule to obtain a positive Wassermann reaction in the serum as well as in the cerebrospinal fluid in paresis, and that it is more likely to be positive in the former than in the latter. The French investigators alone obtain the positive serum reaction infrequently. According to Plaut's own investigations, the serum reaction was negative only in 2 out of 320 cases, and therefore he concludes that a negative reaction of the serum makes a diagnosis of paresis doubtful. When a reaction of the serum has been negative he has never obtained a positive reaction of the cerebrospinal fluid in paresis, but the converse does not hold good. He differs also from French observers in his statement that even in the earliest stage when the clinical diagnosis of paresis is doubtful, the reactions of both fluids is almost invariably positive.

The diagnosis of cerebrospinal syphilis from symptoms is often very uncertain, but if the reaction of those cases is studied in which the histological examination has confirmed the diagnosis, it is found positive, as a rule in the serum, but negative in the cerebrospinal fluid. Exceptions occur, but are rare. A very intense positive reaction of the cerebrospinal fluid is in favor of the diagnosis of paresis as opposed to cerebral syphilis, but a negative reaction of this fluid does not permit a diagnosis of cerebral syphilis.

¹ *Neurologisches Centralblatt*, November 1, 1910, p. 1178.

² *Deutsche Zeitschrift für Nervenheilkunde*, vol. xl, Nos. 5 and 6, p. 347.

³ *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 1910, vol. iv, No. 1.

As regards tabes, Nonne and Holzmann obtained, in 93 cases, 8 positive reactions in the cerebrospinal fluid and 67 in the serum.

Syphilis of the Nervous System with Fever. Fever has seldom been observed in syphilis affecting the nervous system, and when it has occurred it has been of moderate degree. Strasmann¹ reports two cases which during several months presented a temperature between 37.5° and 38.8°, without any complicating process. A necropsy was obtained in the second case, and no disease of other parts of the body could be detected. The second case was important also because the *Spirochæte pallida* for the first time was found in the brain and spinal cord in acquired syphilis. It has been very difficult to detect the organism in the nervous system, but it has been seen here in hereditary syphilis. Ranke stained it in the vessels of the brain and spinal cord in seven syphilitic newborn children, Ravault and Ponselle found it in the veins of the pia in syphilitic fetuses. Sabrazée and Duperée likewise found it in the central nervous system in hereditary syphilitics. These seem to be the only investigators, according to Strasmann, who have been able to demonstrate it in the brain and cord. The organisms were found by Strasmann especially in the walls of the small vessels, and they were still more numerous in the vascular lymph spaces. They seemed to have been carried in the lymph spaces. In this case they were seen only in the central nervous system, although a search was made for them in other tissues.

Salvarsan in Syphilis of the Nervous System. The literature on Ehrlich's new method of treating syphilis has become so extensive that it is well to refer to an excellent critical digest on the subject by William Engelbach,² in which the literature since October, 1910, to January, 1911, is reviewed.

Weintraud concludes that no benefit can be expected from "606" in tabes. The syphilitic virus may injure a predisposed nervous system to such an extent that even the most thorough treatment may not prevent the development of tabes. None of the symptoms in his 20 cases of tabes seemed to be influenced by "606," but the drug displayed great efficacy in patients refractory or intolerant to mercury and iodine.

Frenkel-Heiden thinks the reports of the nervous affections supposedly cured by the use of "606" are not worthy of serious consideration. He believes it is more important, in judging the character of improvement in these diseases, to observe the pupillary reactions than to value highly the subjective symptoms, such as tabetic pains, etc., which often disappear without the application of any drugs. He concedes that active lesions of the nervous system readily respond to the curative action of

¹ Deutsche Zeitschrift für Nervenheilkunde, vol. xl, Nos. 5 and 6, p. 387.

² Interstate Medical Journal, January, 1911, p. 117.

"606," but states that in parasyphilitic diseases the drug must be administered in exceedingly large doses. The question arises, therefore, whether it is justifiable to subject a patient to the dangers of such quantities of the drug, or whether the same results may be obtained by exhibiting the remedy in repeated doses in smaller amounts. Frenkel-Heiden offers reports of cases treated by others with favorable results. The objection raised against the use of "606" is that the nervous tissue in tabes and general paralysis is incapable of restitution; nevertheless, the drug should be used in these diseases, since the actual degree of degeneration is not known, and there always remains the possibility of arresting the progress of the degeneration. The relief of the pains in tabes and the improvement of the paretic ocular muscles should not always be ascribed to a regeneration of nerve tissue, but they may follow the removal of gummatous pressure on the meninges. The progress of tabes, in his opinion, is due more to the progressive arteriosclerosis and to intercurrent infections than to direct degeneration of the nervous tissue. He concludes that "606" is not contraindicated in general paralysis and tabes, that its use is not attended with danger, and that it exerts a favorable action upon tertiary lesions of the central nervous system; but has very little effect, either favorable or unfavorable, upon parasyphilitic affections.

Willige thinks the action of "606" upon metasymphilitic diseases of the nervous system is uncertain. Some results indicate the possibility of improvement by this treatment. The best results have been obtained from repeated small doses.

Treupel reports regarding 6 cases of syphilis of the central nervous system, that in 4 the reaction was very favorable to "606" in a comparatively short time, and no recurrence of symptoms indicating lesions occurred since the recovery. In 21 cases of tabes and taboparalysis, he gives the following reports. For two to three days the lancinating pains would frequently be increased. After this they would gradually lessen and the general condition would improve, as was evidenced by gain in weight and strength. The paresthesia and disturbance of the bladder would become less, and the ataxia would decrease. This improvement would last for months, but would not be permanent. No important effect upon the pupils was observed, and optic atrophy was not increased in any case. The Wassermann reaction became negative in a small percentage of the cases. In 10 cases of general paralysis, some of which were in their incipency, there was apparent arrest of the disease with the exception that confinement was necessary. He concludes that in diseases producing a degeneration of the nervous system this method of treatment will give little relief, and it is not yet known whether it is able to stop the progress of incipient cases.

These are the most important statements to be found regarding the

nervous system in Engelbach's excellent review, but there are many more regarding the effect of "606" on other tissues.

The reports of accidents following the treatment with salvarsan have been collected by Schamberg.¹ He states that inflammation of the optic, auditory, facial, and other cranial nerves has developed in a minute percentage of cases after the use of salvarsan in syphilis, but the same complications may occur spontaneously or after the use of mercury.

Whether the incidence of such neuritic complications is larger after salvarsan than after mercury is a mooted question, on which foreign specialists are not agreed. These inflammations have occurred almost exclusively in cases of recent syphilis. They appear to have occurred exclusively after intramuscular and subcutaneous injections and not after the intravenous administration. Optic and auditory neuritis have in many instances cleared up under a second dose of salvarsan, or under mercury and the iodides. Most of the cases of neuritis have occurred two to three months after a single injection. A risk is incurred in discontinuing antisypilitic treatment for a long period in early syphilis, after a single injection of salvarsan, particularly when given subcutaneously or intramuscularly. It would be likewise dangerous to cease treatment after brief mercurial administration. The intravenous method of treatment has many advantages over the treatment by other routes.

Ataxia Infantilis. Various forms of ataxia occur in childhood, as the Friedreich's ataxia, juvenile tabes, disseminated myelitis, etc., but Oppenheim² believes he has observed a form not hitherto mentioned in the literature. One of his patients was a boy, aged eight years. Ataxia developed gradually in the left lower limb, and this condition was followed by ataxia of the left upper limb. Hypotonia was observed in the left lower limb, and the patellar and Achilles tendon reflexes were lost only on the left side. The motor power of both lower limbs was preserved. Tactile sensation and sense of position were much diminished in the left lower limb, and pain sensation was lessened. Sensory disturbances of the left upper limb similar to those of the lower were obtained. Oppenheim believes that unilateral degeneration of the posterior columns existed in this case, but not a true tabes. He reports also another similar case. Congenital tabes is not known. In one case saturnism in the father, and in the other alcoholism in the parents had some connection supposedly with hypoplasia of the posterior columns of one or both sides. The disorder has some relation to Little's disease, but differs in the region of the cord affected. As yet no necropsy has been obtained in a case of this ataxia infantilis.

¹ Journal of the American Medical Association, May 20, 1911.

² Neurologisches Centralblatt, 1911, No. 9.

Poliomyelitis. Cassirer¹ has recently reviewed the newer knowledge of poliomyelitis. Landsteiner and Popper were the first to produce the disease in apes, and similar results were obtained by Flexner and Lewis, and Römer. Krause and Meinicke successfully infected rabbits, and carried the infection from these to other rabbits and to apes. Experiments have shown that the part of the nervous system affected depends on the region of infection, as when the mouth was the portal of entry the forward part of the body was paralyzed first. The period of incubation has varied from four to thirty-three days. An immunity has been obtained for at least ninety-nine days. The agent of the infection probably belongs to the protozoa. Many members of a family are seldom affected, but seven children in one family have shown the disease. Pain has been a frequent symptom, contrary to the opinion that formerly was held, and may be associated with stiffness of the neck and back and Kernig's sign. The paralysis may develop gradually. Formerly it was thought to be almost always of very rapid onset. Experience has also shown that polyneuritis is not so rare in childhood as has been taught, and this disease has to be considered in making a diagnosis of poliomyelitis. The importance of quarantine has been emphasized, and warm baths have been highly recommended in treatment. Lumbar puncture is not favored by Cassirer, but I have known it to give great relief when pain was intense. In such cases, the cerebrospinal fluid is probably increased in amount.

Flexner's² paper contains the results of recent investigations on poliomyelitis. Greater New York and Boston are the two centres in the United States which receive first and in most concentrated way the immigrant population from northern and eastern Europe, and, in Flexner's opinion, the prevalence of poliomyelitis in these cities in the recent epidemic may be explained in this way. Data collected in Scandinavia indicate that the contagion can be carried by intermediate persons from the stricken to the healthy, and from persons not frankly paralyzed, but affected with slight or abortive attacks of the disease. The incubation period may vary from two, three, or four days to as much as twenty days, the average being eight or ten days. While the actual organism has not been determined, it has been shown that it is so minute as readily to pass through the pores of earthenware filters. A striking similarity exists between the frank examples of epidemic poliomyelitis, whether occurring spontaneously in man or produced experimentally in monkeys, but the mortality is much greater in monkeys. The virus is highly resistant to external agencies. Flexner has propagated it through twenty-five generations, representing twenty-five separate series of monkeys, and its activity has increased in the

¹ Berliner klin. Wochenschrift, 1910, No. 50.

² Journal of the American Medical Association, September 24, 1910, p. 1105.

course. Flexner thinks the nasopharynx is the location in the body to be regarded with special suspicion as being the portal of entry of the virus. He has never succeeded in reinfecting monkeys that have been once paralyzed by the virus of poliomyelitis.

Flexner states that the serum treatment of poliomyelitis must at the present time be regarded as strictly in the experimental state, and it cannot be predicted how soon or whether such a form of specific treatment of the disease will ever be applicable to the spontaneous epidemic disease in human beings.

In the report of the observations made by C. K. Mills,¹ reference is found to the recrudescent form of the disease, and two cases are cited as examples. In this type, improvement occurs after an acute onset, and some days later the symptoms again become intense. Mills' experience has been that the period of incubation is from one to two weeks. He refers to a case in which an adult who had had poliomyelitis in infancy, and had recently been in a region where this disease was prevailing, developed multiple neuritis, and the suggestion is made that in this case the infection may have attacked the nerves instead of the cord. This article by Mills is a presentation of some of the unusual features of poliomyelitis seen in about 45 cases within a short time and in earlier cases.

POLIOMYELITIS AND HERPES ZOSTER. The question is asked by Garrow² whether poliomyelitis and herpes zoster are the same disease. During August and September, 1910, when acute poliomyelitis was epidemic in Maryport, he observed that there was an unusual number of cases of herpes zoster. The appearance of these diseases simultaneously in epidemic form seemed remarkable. In the one disease, the lesion is chiefly in the anterior gray matter of the cord; in the other, it is in the posterior root ganglia. The lesion is similar in the two diseases. The constitutional symptoms in both diseases, Garrow points out, are the same. Henry Head has called attention to the analogy between the two affections. Garrow remarks that the wonderful analogy that exists between them, looked at from every point of view, and the fact that they occurred simultaneously in epidemic form in the same place, raises the question, may they not be dependent on the same infective process, attacking the anterior horns of the spinal cord in the one case and the posterior root ganglia in the other?

GERMICIDAL ACTION OF SERUM FROM PATIENTS WHO HAVE HAD POLIOMYELITIS. Anderson and Frost³ have repeated some of the experiments done by others, and they conclude that the serum of persons who have recently recovered from poliomyelitis exhibits a germicidal action on the virus considerably greater than that exhibited

¹ International Clinics, 1911, vol. i, twenty-first series.

² British Medical Journal, March 18, 1911, p. 621.

³ Journal of the American Medical Association, March 4, 1911, p. 663.

by normal serum. Serum from a person suffering from paralysis of spastic type showed the same properties, thus confirming the clinical evidence that acute poliomyelitis may cause paralysis of this type.

The serum of 6 out of 9 of their patients (66.7 per cent.) who had recently recovered from suspected poliomyelitis without paralysis (abortive cases) showed the same germicidal action as the serum from a frank case of poliomyelitis.

They were unable to demonstrate any germicidal property beyond that shown by normal serum, in the serum from 3 suspected abortive cases. These 3 specimens of serum were obtained from young persons, and the cases clinically resembled poliomyelitis more than did some of the adult cases. It may be that they were not really cases of poliomyelitis, or if they were, antibodies may have been formed in less amount, or may have disappeared more rapidly than in the adult cases.

The experimental evidence on which the specificity, constancy, and quantitative relations of this reaction were estimated was scant. So far as it goes the authors believe it justifies the inference that the reaction is specific. They feel warranted in concluding that the diagnosis of acute poliomyelitis was established in 6 of their 9 suspected abortive cases.

Flexner and Clark¹ state that it is possible by means of neutralization tests to determine in a given instance whether an attack of poliomyelitis did or did not occur, and this independently of the circumstance whether or not paralysis was present. The test is made by mixing the blood serum with the filtered virus, incubating the mixture at 37° C. for a few hours, and injecting it into a monkey. Normal human serum has no power to neutralize the virus, while the serum from recovered cases of poliomyelitis possesses this power. In one case, Flexner and Clark demonstrated the presence of neutralizing immunity principles in the blood taken from a patient suspected of having passed through an abortive attack. The method is of value in establishing the occurrence of abortive cases of poliomyelitis.

These investigators have found that the immunity principles persist in the blood for several years, and they believe they are elaborated in the lymphatic and blood-forming organs, in which antibodies in general are prepared. They have found also, in studying the effect of *urotropin*, that drug control of the virus of poliomyelitis within the body is a possibility, but the successful results have been secured in inhibiting infection and not in restraining an already established infection with the virus. It is uncertain whether *urotropin* is of value in the treatment of human beings.

An increase of the cellular contents and an excess of protein in the cerebrospinal fluid, determined by the Noguchi butyric acid test, occur in the early stage of poliomyelitis, and are of diagnostic value.

¹ Journal of the American Medical Association, February 25, 1911.

LUMBAR PUNCTURE IN POLIOMYELITIS. The value of lumbar puncture in the diagnosis of poliomyelitis is shown in a case reported by Lewis F. Frissell.¹ A man, aged twenty-one years, had symptoms that might have been regarded as those of typhoid fever, influenza, or intestinal toxemia. The fluid obtained by lumbar puncture was examined by Flexner. The specimen consisted of a limpid fluid, almost but not quite clear, and yet not turbid, showing a faint opalescence upon agitation. Upon centrifugalization, the fluid yielded sediment containing a considerable number of small and a small number of large lymphocytes, and a very few polynuclear leukocytes. There were no red blood corpuscles. The perfectly clear supernatant fluid gave a marked protein reaction with Noguchi's butyric acid test. The specimen, therefore, contained excess of white corpuscles, chiefly lymphocytes, and of protein. The condition of the fluid resembled that seen in monkeys inoculated with the virus of epidemic poliomyelitis, just before the onset of paralysis.

It was thought that from this report, as tuberculous meningitis could be excluded, a diagnosis of poliomyelitis might be made, and that paralysis, if it ensued, would come shortly. Paralysis soon developed, and lumbar puncture was again performed. The opalescence of the fluid was less, and the reaction for protein in the supernatant liquid was diminished. The condition resembled that seen in monkeys after paralysis has set in.

In the early stage in this case the neck was slightly rigid and the tendon reflexes were exaggerated, even ankle clonus was obtained. The exaggeration of the reflexes gradually diminished and disappeared when the paralysis set in, and some of the tendon reflexes, as the patellar, were lost.

By lumbar puncture in this case a diagnosis was established, and the fact that paralysis would probably follow was determined twenty-four hours before its onset. By a second lumbar puncture twenty-four hours after the onset of the paralysis, the fact was determined that the height of the paralysis had passed, and that the paralytic stage was nearing an end. The puncture had both prognostic and diagnostic value. In monkeys, Flexner has found that the increase in lymphocytes and increased protein reaction are present in the spinal fluid only a few days. This is the first case, however, in which he has followed the corresponding reactions in man.

The conclusions that Hough and Lafora² reach after a study of the cerebrospinal fluid in poliomyelitis are: The fluid is generally clear; there is in the early stages of the disease an increase of pressure, although this is not generally pronounced, and there is usually an increase of the protein content sufficient to give a positive Nonne-Alpelt and Noguchi butyric acid reaction.

¹ Journal of the American Medical Association, March 4, 1911, p. 661.

² Folia Neurobiologica, March, 1911, No. 3, p. 221.

In the earlier stages of the disease there is a more or less pleocytosis in the spinal fluid. There are many polymorphonuclear leukocytes which are probably dependent upon the reaction of the meninges to the penetration of the virus into the central nervous system.

The increase of the polymorphonuclears disappears a few days after the acute onset of the disease, and is substituted by a lymphocytosis with some plasma cells and sometimes a few mast cells.

The disappearance of the polymorphonuclears is brought about through the rapid and vigorous phagocytic activity of the macrophages, which sometimes contain twenty or more rests of the polynuclear elements.

These degenerated polymorphonuclear leukocytes show in the framework of the macrophages very different degrees of histochemical changes which are indications of rapid processes of digestion.

The presence of the altered red blood cells in the spinal fluid is probably dependent upon capillary hemorrhages in the spinal cord, which is a consequence of the selective preference of the disease for the spinal vessels.

Körnchenzellen, altered lymphocytes, and other mononuclear elements are commonly present in the fluid until after the fever period.

These investigators were not able to find any stained bacteria.

The similarity of the histopathology of the spinal fluid in poliomyelitis to that of the fluid in some protozoan diseases affecting the nervous system the authors think is an argument in favor of the protozoan nature of the virus in poliomyelitis, even though some other investigators assert that the disease is produced by a very small organism.

ACUTE POLIOENCEPHALITIS. Occasionally symptoms indicating implication of the brain occur in poliomyelitis, especially of the basal part of the brain, pons, and medulla oblongata, but Reginald Miller¹ emphasizes the fact that the brain alone may be affected. The patient is usually a healthy, robust child, between the sixth month and sixth year of age. Most cases occur in the second and third years of life, and in the hot months. The symptoms vary according to the portion of the brain involved. Miller's paper is a summary of the known cases without any report of new cases.

An interesting case of polioencephalomyelitis, with the clinical picture of Landry's palsy of the descending type, is reported by Auerbach.² The first sign was severe pain of sudden onset between and over the eyes, followed within a few hours by almost complete blindness. Exaggeration of the tendon reflexes of the lower limbs, ankle clonus, temporary unilateral Babinski's sign, present in this case, are very uncommon in poliomyelitis; and yet the pathological findings were

¹ The Practitioner, July, 1910, p. 94.

² Monatsschrift für Psychiatrie und Neurologie, vol. xxviii, No. 4, p. 283.

those of poliomyelitis. The optic nerves were found to be greatly altered by microscopic study.

LATE ATROPHY WITH POLIOMYELITIS. The reappearance of muscular atrophy of a progressive type, it may be years after the occurrence of acute poliomyelitis, has been observed sufficiently often to show that there is some connection between the two processes. Pastine¹ has studied two cases, in one of which the atrophy began seventeen years after the attacks of acute poliomyelitis; in the other, seventy-five years later. The latter case was with necropsy, and the cause of the late atrophy was chronic anterior poliomyelitis. In cases of this type Cassirer has found muscular dystrophy, Hirsch diffuse cervical myelitis, Oppenheim disseminated myelitis and occupation atrophy. When one considers the great number of cases of acute poliomyelitis that occur, the few cases in which late atrophy develops need not cause undue anxiety.

INTRA-UTERINE POLIOMYELITIS. Much doubt has always existed as to the occurrence of intra-uterine poliomyelitis, and little is found in literature justifying the assumption of the intra-uterine type. It is difficult to exclude injury to the brachial plexus at birth or hemorrhage into the gray matter of the spinal cord in newborn infants.

Batten² reports a doubtful case and one positive case which he considers an example of intra-uterine poliomyelitis. The child was two years old when Batten first saw him. The mother was a reliable person, and she stated that the left upper limb was weak at birth. The labor lasted only twenty minutes, and the child fell from the bed to the floor. The condition found on study of the pathological material was exactly like that in late cases of poliomyelitis. It seems to Batten improbable that an attack of poliomyelitis so severe as partially to paralyze both legs and give rise to a complete paralysis of the shoulder muscles should occur after birth without giving rise to any constitutional symptoms, and furthermore, the mother was positive that the left arm was paralyzed at birth. It was therefore not a case of poliomyelitis developing after birth, the onset of which was overlooked.

If the cause were spinal hemorrhage, the lesion to have caused such widely distributed paralysis must have been extensive, involving cervical, lumbar, and sacral regions. Batten concludes from the character of the lesions that it is most improbable that the condition could have been caused by hemorrhages of the cord.

He excludes likewise arrested development and spinal changes resulting from lesions of the peripheral nerves.

Tumors of Cord. **TESTICULAR SENSIBILITY.** A cyst or tumor of the cord, if located in the lower thoracic segments, may give valuable

¹ *Revue Neurologique*, 1910, No. 8, p. 466.

² *Brain*, 1910, Part 129, vol. xxxiii, p. 149.

information regarding sensation of the testicles. In a case observed by C. S. Potts,¹ isolated anesthesia of the testicles was present and disappeared after removal of a spinal growth. He refers to Mueller's statement that the penis and scrotum are innervated by the pudendal nerve, a branch of the sacral plexus, and that the testicles receive their sensory fibers from the external spermatic nerve, a branch of the genitocrural, which arises mainly from the first and second lumbar roots. This explains the existence of anesthesia of the scrotum and penis with integrity of sensation in the testicles. Head also has made investigations concerning testicular sensibility.

Potts finds that his case only partly supports the localizations of Mueller and Head. The lesion in his case did not extend as high as the tenth thoracic segment, as given by Head, but involved only the eleventh and twelfth thoracic and first lumbar segments. It seems probable from his case that more than the first lumbar segment is concerned, as given by Mueller, for this segment was less involved than the others, and the cremaster reflex, while absent on one side, was present on the other; both testicles, however, were analgesic. It seems probable to Potts that the spinal areas for testicular sensibility consist of the eleventh and twelfth thoracic and first lumbar segments.

DISSOCIATION OF SENSATION WITH SPINAL TUMOR. One of the most interesting features in a case of spinal tumor reported by Bovaird and Schlapp² was the dissociation of sensation. The patient had loss of pain and temperature sensations, while the tactile and muscular sensations were practically normal. The tumor surrounded the cord and compressed it equally from all sides, and therefore involved or interfered with the function of those systems which are situated peripherally in the cord. There is much reason to believe that the fibers of pain and temperature sensations ascend in the anterolateral columns. This case, therefore, is another in evidence that dissociation of sensation of the syringomyelic type may be produced by an extramedullary spinal lesion as well as by an intramedullary lesion.

It was thought that a subdural spinal hemorrhage occurred from injury, and as a result of this a tumor developed. There is a possibility that a vascular tumor formed first, and by rupture of some of its vessels extensive hemorrhage occurred. Indeed, I have had a case in which similar tumors of the brain gave rise to many hemorrhages. The rapidity of tumor formation in Bovaird and Schlapp's case after an injury to the back is remarkable, and seems to have been too great to permit the assumption that the lesion directly caused the tumor.

CEREBROSPINAL FLUID WITH SPINAL TUMOR. Kleiberger³ has observed a peculiar condition of the cerebrospinal fluid which he con-

¹ *Journal of Nervous and Mental Disease*, October, 1910, p. 621.

² *Ibid.*, April, 1911.

³ *Monatsschrift für Psychiatrie und Neurologie*, vol. xxviii, No. 4, p. 346.

siders of diagnostic value. In four cases of extramedullary tumor of the spinal cord the fluid obtained from beneath the tumor by lumbar puncture was intensely yellow, much more yellow than is seen occasionally in tuberculous meningitis or after hemorrhage with blood-coloring matter in the cerebrospinal fluid. The fluid in Kleineberger's cases was clear and contained no blood. The fibrin coagulum differed from that in tuberculous meningitis; it formed very rapidly, whereas in meningitis twenty hours are necessary for its formation; and in the yellow fluid a second fibrin coagulum formed soon after the removal of the first. The yellow color probably is derived from the blood when the circulation of the cerebrospinal fluid is obstructed by a spinal tumor. Such fluid Kleineberger thinks is characteristic, possibly even pathognomonic, of spinal obstruction, as from tumor or meningitis.

Now that operations for the removal of tumors on the spinal cord have become so frequent, it is well for us to remember that there are certain cases of organic disease of the cord which give many of the symptoms of tumor and make the differential diagnosis difficult. Nonne¹ reports several cases of this character.

Circumscribed Serous Spinal Meningitis. Another case of this rather rare disease is described by Weisenburg and Müller.² The operation was successful, and seven months later the patient was still entirely well. Weisenburg believes that the variation of the sensory and motor symptoms in consecutive examinations is sufficient to distinguish circumscribed serous spinal meningitis from tumor. This may be questioned. The cyst acts as a tumor, it may be very small at first and gradually enlarge, and the variation in symptoms probably is not caused by variation in amount of fluid in the cyst. It is probably produced by the degree of pressure exerted by the fluid above the cyst, as it is in spinal tumor. A true circumscribed serous spinal meningitis clinically is the same as tumor, and gives the symptoms of tumor on the cord.

In a case of this disorder reported by Mills,³ operation was performed by Frazier. When the dura was opened, a cyst protruded, and its walls were formed of the pia. The fluid resembled cerebrospinal fluid. The pain at first was entirely relieved by the operation, but later it returned in considerable intensity. So much power was recovered in the lower extremities that the man was able to draw the limbs up and down and to perform various movements with them. After a time voluntary movements returned in the toes. Mental symptoms soon developed, and he had more or less delirium, at times almost mania. He became more profoundly paralyzed, wasted, and contractured, and died in part from exhaustion.

¹ Deutsche med. Wochenschrift, 1910, No. 37.

² American Journal of the Medical Sciences, November, 1910, p. 719.

³ Journal of Nervous and Mental Disease, September, 1910, p. 529.

Mills reviews the literature on circumscribed serous spinal meningitis. He does not regard variations in symptoms as of great value for diagnosing a spinal cyst. In this paper he reports also a case in which a spinal tumor was removed by operation, and much improvement followed.

Subacute Combined Sclerosis. Changes in the spinal cord occurring in pernicious anemia are not uncommon, but the diagnosis sometimes is not promptly made. In a case studied by Byrom Bramwell,¹ the nervous symptoms developed three years before the anemia became sufficiently marked to attract attention. The disease developed at an unusually early age, thirty-one years, and because of ataxic spastic paraplegia, nystagmus, derangement of the bladder and rectum, optic atrophy exactly resembling that characteristic of multiple sclerosis, and periods of remarkable improvement and relapse, the diagnosis of multiple sclerosis had to be considered, and indeed this was the diagnosis made. Subacute combined degeneration of the cord, according to Bramwell, rarely develops before the age of thirty-five, and most cases occur between the ages of fifty and sixty. Optic atrophy is not a feature of combined degeneration of the cord, but in this case it exactly resembled that met with in multiple sclerosis—partial in degree and chiefly confined to the temporal sides of the disks. The dimness of vision was one of the initial symptoms. The remarkable periods of improvement with subsequent relapses were very suggestive of multiple sclerosis, and are rare in subacute combined sclerosis. The lesions found in Bramwell's case corresponded exactly with those described by many writers as characteristic of subacute combined sclerosis of the spinal cord associated with anemia.

Stovain Anesthesia. As stovain produces temporary anesthesia, it occurred to Spiller and Leopold² that repeated injections of the drug probably would produce anesthesia of gradually increasing duration, until finally persisting loss of sensation might be obtained, which would be the result of organic change. These authors desired to ascertain whether a systemic degeneration of the posterior roots and their continuation in the posterior columns of the cord is the common result of the repeated use of stovain. It was desirable to determine whether the paralysis that occurs in stovain anesthesia is of a motor or sensory type, *i. e.*, whether it is produced by changes in the peripheral motor neurones, or is the result of abolition of all afferent impulses which normally pass over the posterior roots. Reflex action and all recognition of tonicity or relaxation of the limbs, and necessarily of the position of the limbs, are lost if all peripheral afferent impulses are cut off.

¹ British Medical Journal, June 11, 1910, p. 1396.

² Journal of the American Medical Association, June 4, 1910, p. 1840.

Persistent anesthesia of the hind limbs was produced in dogs by stovain injection, and degeneration was obtained in the lower anterior and posterior roots, even in the nerve fibers within the spinal ganglia. The paralysis was shown to be from disease of motor fibers. The lesions could not have been produced by the trauma of the needle. It would be unwarranted to apply these findings too strictly to man, as no grave changes have been found as yet in the human spinal cord. At most, the findings would show that repeated injections of stovain might be injurious, and would make one cautious in employing several injections within a short time in the same subject.

Friedreich's Ataxia. An opportunity has been given to me¹ recently to study a case of Friedreich's ataxia by microscopic sections. This is seldom afforded, as cases of this disease with necropsy are very rare. The view is entertained by some writers that all the family diseases are closely related, and that in each family affected atypical features may be found. It is difficult to establish the correctness of this view, and it has not met with universal favor. Unquestionably borderline cases occur which might be classed by one author with one group, by another author with another group. Thus, in my case of Friedreich's ataxia a condition resembling pseudomuscular hypertrophy was found.

The lesions in my case were like those found by others in Friedreich's ataxia, but remarkable were fatty degeneration within muscle fibers detectable by the Marchi stain, degeneration of the sensory roots of the trigeminal nerves, and the presence of numerous naked axis cylinders shown by the Bielschowsky stain in the greatly degenerated columns of Goll. From the latter finding may be explained the integrity of sensation in many cases of Friedreich's ataxia.

It is necessary to recognize the occurrence of muscular atrophy in this disease, even though it is usually a late sign. Its existence, however, has been called in question.

It is usually stated that sensation is not affected in Friedreich's ataxia, or if it is, the alteration does not occur until late. Singer² has made a careful study of this subject, using the cases reported in the literature and ten cases of his own. Disturbances of sensation are recorded in about 35 per cent. of all the reported cases, but Singer believes they are even more frequent. They may occur at any stage of the disease, but are not so common in the early stages. Most frequently the sense of position and tactile sensation are affected. Symptoms of sensory irritation (pain) are not so frequent as impairment of sensation. The lower limbs, and especially their distal portions, show the disturbances. The alteration does not correspond to nerve or root distribution. Remissions may occur, but usually the anesthesia is slowly

¹ Journal of Nervous and Mental Disease, July, 1910, p. 411.

² Monatsschrift für Psychiatrie und Neurologie, June, 1910, p. 489.

progressive. A parallelism does not exist between the sensory disturbances and the ataxia. Alteration of pain and temperature sensations are relatively rare.

Pott's Disease. The most common disorders afford interesting fields for study, as shown, for example, by a valuable paper on the sudden onset of paralysis in Pott's disease without deformity of the vertebræ, written by W. B. Cadwalader.¹ In one of the cases he reports, hydrocephalus of the lateral ventricles was present. He suggests that this may have been caused by the compression of the cord, and he finds support for this view in a case of choked disk occurring with spinal tumor, reported by Pearce Bailey.

An instantaneous onset of paralysis is rare in Pott's disease, especially without trauma. In two of the cases reported by Cadwalader, the development of the paralysis was very rapid, apoplectiform in the strictest sense of the term. He has found only two similar reported cases. He is inclined to attribute the sudden palsy to thrombosis, but he is uncertain whether it was produced by sudden increase of pressure with thrombosis, or to increased pressure without thrombosis, or to the changes which were found within the cord.

The diagnosis of Pott's disease when deformity of the spine is not present may be exceedingly difficult or impossible. The symptoms are usually caused by slowly increasing pressure upon the cord by a dry inflammatory exudate, sometimes an exudate with pus, although pus may be entirely absent. Operation in some cases may be of advantage. In one case which Cadwalader reports, no implication of the vertebræ was found at necropsy and a tuberculous mass pressing on the cord was removed. Cases of this kind, *i. e.*, of external pachymeningitis without implication of the vertebræ, are very rare.

Myelitis. Bastian² has done much to demonstrate that softening of the cord is common and inflammation is rare, and recently he has written again on this subject. He thinks the evidence is overwhelming that in the great majority of cases of so-called "acute myelitis," and also of "acute poliomyelitis," the affection is caused by thrombosis of some of the vessels of the spinal cord. This conclusion is obvious (1) by the similarity of the morbid changes in question to those occurring in the brain which are due to thrombosis, as well as to the absence of any reason why a primary inflammation should be rare in the brain and common in the spinal cord; (2) by the existence of special conditions favoring the occurrence of thrombosis in the vessels of the spinal cord, and in just such parts of the cord as are most frequently affected, *viz.*, the lumbosacral region; (3) by the fact that the disease is most commonly met with in just such persons and under just such conditions

¹ American Journal of the Medical Sciences, April, 1911, p. 546.

² The Lancet, November 26, 1910, p. 1531.

(as to heart's action, bloodvessels, and quality of blood) as are known to be favorable to the occurrence of thrombosis; (4) by the fact that the mode of onset and early symptomatology of the affection are different from what they would be had an inflammation of the cord actually existed, *i. e.*, such symptoms as malaise, shivering, headache, depression, loss of appetite, and pyrexia are absent; and (5) by the absence of any reasonable cause of inflammation in the majority of those in whom the malady appears.

The recent work on poliomyelitis makes thrombosis as a cause of this disease very improbable.

Pellagra. The first study of the nervous system in an American case of pellagra has been reported recently by Anderson and myself.¹ The reports of foreign cases have been conflicting; whereas previously the degeneration was regarded more as systemic, recent studies have indicated that pellagra produces a diffuse degeneration. In both cases reported in our paper the osmic acid method of Marchi revealed considerable diffuse alteration of the anterolateral and posterior columns. The nerve cells of the anterior horns and of the cerebral cortex, in the case in which they could be examined, were greatly affected.

It is doubtful, therefore, judging by recent methods of study, whether pellagra ever produces a systemic disease of the spinal cord. The condition resembles that seen in grave anemia. It is not difficult to explain the mental symptoms when cortical degeneration is so intense as may occur in pellagra, and as seen in the brain I studied.

The constant involuntary movements of the limbs occurring in pellagra, may be explained by degeneration of the cells of the anterior horns, probably causing irritation in the muscles innervated by them; by the impairment of cerebral inhibition produced by partial degeneration of the pyramidal tracts; and by the incoördination produced by the partial degeneration of the posterior columns, the cerebellar tracts, and the cells of Clarke's columns.

Amyotrophic Lateral Sclerosis. A peculiar form of family disease, and one apparently different from any as yet described, has been observed by Otto Maas.² A brother and sister were healthy until the age of fourteen years, then weakness, incoördination, and atrophy appeared. A clinical picture much like that of amyotrophic lateral sclerosis developed, except that the incoördination is unusual in this disease. It differed from Friedreich's ataxia in the presence of early muscular atrophy. The findings were much like those of amyotrophic lateral sclerosis, *viz.*, degeneration of the lateral columns, especially of the crossed pyramidal tracts, and of the cells of the anterior horns. The cerebellum, however, was unusually small, and the diminution in size

¹ American Journal of the Medical Sciences, January, 1911, p. 94.

² Deutsche Zeitschrift für Nervenheilkunde, vol. xli, Nos. 1 to 3, p. 236.

of this organ probably explained the incoördination. The commencement of amyotrophic lateral sclerosis at the age of fourteen is extraordinary, and the disease has not been recognized as a family affection. Like some other family diseases, the type described by Maas is not easily classified.

One would hardly expect general neurofibromatosis (v. Recklinghausen's disease) to simulate amyotrophic lateral sclerosis, but that it may do so is shown in a case reported by Peusquens.¹ Both lower and both upper limbs were weak, the tendon reflexes of the upper limbs and the patellar reflexes were exaggerated, patellar clonus and Babinski reflex were present, the hands were atrophied, but sensation was intact. This is the symptom complex of amyotrophic lateral sclerosis. Tumors were found implicating several of the cranial nerves, the medulla oblongata, the cervical and lumbar portions of the cord, and many spinal roots. Scattered tumors beneath the skin might have led to a correct diagnosis if general neurofibromatosis had been suspected.

Multiple Sclerosis. In a case which presented some of the symptoms of multiple sclerosis, observed by Weisenburg and Ingham,² the whole brain was small, but the most distinct changes were found in the brain stem. The cerebral peduncles and all parts of the pons were greatly reduced in size. Areas of sclerosis were found, especially in the pons and cerebellum, and such areas also were seen throughout the white and gray matter of the brain, in some of the cranial nerves, and to a less extent in the anterior and posterior spinal roots. The motor tracts were primarily degenerated. The authors believe the condition was one of congenital hypoplasia. Some of the areas of sclerosis were peculiar in that they represented areas of imperfect staining, rather than the complete lack of coloring, and corresponded to what Schlesinger has called "shadow sclerosis."

The symptoms appeared about the thirty-second year of life, at which time the man developed a tremor of the entire body, an uncertainty of gait, his lower limbs became stiff and weak, and difficulty in talking and eating and involuntary laughter and crying appeared. Bulbar symptoms persisted, the weakness and stiffness in the limbs increased, he became confined to his chair, and had exaggeration of tendon reflexes.

The case is well reported, and discussion of its relation to diffuse sclerosis and pseudosclerosis is given. One can hardly avoid the conclusion that agenesis rather than atrophy was the more important cause of the symptoms.

Neurotic Muscular Atrophy. Cases of this disease with necropsy are rare, and the one reported by Aoyama³ is especially interesting in that bulbar symptoms and attacks of retention of urine were present. The

¹ Deutsche Zeitschrift für Nervenheilkunde, vol. xl, Nos. 1 and 2, p. 56.

² Journal of Nervous and Mental Disease, November, 1910, p. 675.

³ Deutsche Zeitschrift für Nervenheilkunde, vol. xl, Nos. 3 and 4, p. 207.

patient had bilateral laryngeal palsy with anesthesia of the laryngeal mucous membrane, and lateral nystagmus, in association with the atrophy of the limbs. The nuclei of the facial, hypoglossal, and vagal nerves were altered.

In the case of neurotic muscular atrophy reported by Cassirer and Maas¹ the clinical diagnosis seemed positive, although reflex rigidity of the pupil was present. A careful microscopic study showed that the spinal cord was intact, with the exception of unimportant alteration. In this respect this case differs from those of neurotic muscular atrophy previously reported, as it has not been uncommon to find intense alteration of the posterior and lateral columns. The peripheral nerves and the muscles were greatly diseased, so that the process is described as chronic neuromyositis multiplex. The nuclei of the muscles and of the intramuscular fibrous tissue were so increased in number in some places as to resemble abscess.

The reflex rigidity of the pupil with the integrity of the spinal cord shows that the former is not dependent upon alteration of the spinal cord, and that attempts to make it appear as if it were, as Reichardt has done, in regard to the cervical region, cannot be successful. The term "spinal myosis" has no justification, if one employs it as indicating that the myosis is caused by the disease of the spinal cord.

DISEASES OF THE NERVES

Alcohol Neuritis in Childhood. Eichhorst² has found that in Zurich alcoholic multiple neuritis occurs about as frequently in men as in women. The occurrence of it in young children is very uncommon. He refers to a few cases in the literature, and reports a case in a boy, aged eight years, who at first was supposed to have pseudomuscular hypertrophy. The patient was detected leaving his bed secretly at night, and drinking the alcohol in the laboratory lamps. From this time he was prevented from obtaining alcohol, and after eight months left the hospital cured. The boy's father drank much.

This appears to be the fifth case of alcoholic multiple neuritis in a child reported; 2 of the 5 cases have been observed by American physicians (Leszynsky, Herter). Eichhorst's patient had quite active patellar reflexes, and this condition has been seen in adults with multiple neuritis. His patient had no spontaneous pain in the limbs, no pain upon pressure, and no paresthesia; he had, however, lumbar pain. Fatty change in muscles paralyzed by alcoholic neuritis is recognized, and the part may become enlarged by the fat formation, so that the enlargement of the calves in Eichhorst's patient could easily be explained. It suggested,

¹ Deutsche Zeitschrift für Nervenheilkunde, vol. xxxix, Nos. 3 and 4, p. 321.

² Correspondenz-Blatt für Schweizer Aerzte, 1910, p. 968.

however, pseudomuscular hypertrophy. Fascicular twitching was present in the upper limbs. This he observed in 2 cases out of 45 of multiple neuritis in adults. He states that occasionally a twitching of this character, contrary to the belief of most physicians, is seen in pseudomuscular hypertrophy. The diagnosis of alcoholic multiple neuritis in a child is difficult, as one is not prepared for its occurrence.

Anterior Crural Neuritis. Sciatica is common because the sciatic nerve is the largest nerve of the lower extremity and much exposed, but other nerves of the lower limbs are sometimes the seat of inflammation. Waterhouse¹ employs the term anterior crural neuritis when the nerves on the anterior and inner part of the thigh are affected. It is something of a misnomer, as more than the anterior crural nerve is involved. He describes an affection chiefly met with in middle-aged or elderly men, in whom no evidence of any causes of pressure are manifest; an affection characterized by marked wasting and by loss of power, not amounting to complete paralysis, in the muscles of the front and inner sides of the thigh, together with a complete absence of sensory changes except pain. He reports 6 cases, and quotes from the literature to show that the affection is rare. The symptoms are pain in the sensory supply of the lumbar plexus and weakness of the muscles which flex and adduct the hips and extend the knee. The manner in which a patient indicates the site of pain is very characteristic. He first places the palm of the hand over the front part of the iliac crest, and then sweeps it down over the front of the thigh. Sometimes tender spots are present at the junction of the upper and middle thirds of the thigh on the inner side, and at a point on the inner side of the dorsum of the foot. The effect of the muscular weakness is shown by difficulty in mounting stairs, in rising from the sitting position, and in crossing one leg over the other, while in walking there is a sense of insecurity about the knee-joint, and this joint may flex unexpectedly. The affected thigh is colder than the other, the muscles of the front and inner side of the thigh are atrophied, and the patellar and cremasteric reflexes are lost.

Rupture of Joint Capsule Simulating Neuritis. T. Turner Thomas² has made extensive studies upon lesions of the shoulder-joint. He thinks that the relaxation of the muscles and ligaments of the shoulder, usually ascribed to paralysis of the circumflex nerve or brachial plexus, in some cases is not produced in this way. It can result from a tearing of the ligamentous or ligamentous and muscular supports which maintain the humerus at its normal level. By operation, in such cases, the normal joint relations can be restored, and the operation can be followed by a complete or almost complete return of function in the paralyzed muscles.

¹ Saint Bartholomew's Hospital Reports, vol. xlvi, p. 65.

² Journal of Nervous and Mental Disease, April, 1911.

Such a result he obtained in 2 cases, the operation having been performed in one case eight weeks and in the other five weeks after the accident which caused the palsy. How long after the accident a good result can be obtained remains to be determined. Thomas thinks the paralytic dislocations of the shoulder ascribed to poliomyelitis and to injuries of the brachial plexus at birth may be the result of a similar cause, and that by early operation a cure may be obtained.

MISCELLANEOUS NERVOUS DISEASES

Traumatic Neurasthenia. After injuries of the head it is not unusual to observe certain symptoms persisting for a long time, such as headache, vertigo, diminished power of attention, lessened concentration of thought, mental and physical fatigue after slight exertion, irritability. These symptoms are often classed as neurasthenic, but Weitz¹ has found that the pressure of the cerebrospinal fluid is much increased in these cases. One may readily understand that when the pressure of this fluid is increased, mental effort, bending of the body forward, etc., increase the flow of blood to the brain, and this with the increased pressure produces vertigo. Weitz determined the increase of pressure by lumbar puncture.

Migraine. It is unusual for migraine to occur in so many members of a family as in a family studied by George E. Price.² His patient had serious complicated attacks. Investigation showed that two paternal aunts and the father of the patient and six of his brothers and sisters had migraine.

Thomsen's Disease. Sedgwick³ has observed a family affected with Thomsen's disease, with a history of marked von Graefe's sign for five generations. The sign was so evident that it was considered by the family the most interesting manifestation of the condition, and the underlying myotonia had gone undiagnosed through several generations. Sedgwick has found only one reference to the occurrence of this sign in Thomsen's disease, and this was by Oppenheim, who had one case; and it is not stated that Oppenheim's patient was a member of a family in which the sign had existed in several generations.

Male Menopause. That a change of character may be detected in the male at a period corresponding to the menopause in the female is not widely recognized, but certain authors, notably Church, in America, and Kurt Mendel,⁴ in Germany, have observed such a change and have attributed it to diminished sexual power. Mendel states that the male

¹ *Neurologisches Centralblatt*, October 1, 1910, p. 1010.

² *Monthly Cyclopædia and Medical Bulletin*, November, 1910, vol. iii, No. 11.

³ *American Journal of the Medical Sciences*, July, 1910, p. 80.

⁴ *Neurologisches Centralblatt*, October 16, 1910, p. 1124.

between the ages of forty-seven and fifty-seven years, especially between fifty and fifty-four years, experiences a condition of anxiety and unrest; he does not seem to be able to accomplish his desires, he feels generally weak, and a tendency to weeping becomes manifest. Some patients complain of a feeling of congestion of the head, heat, palpitation of the heart, sleeplessness, headache, vertigo, failure of memory and attention, mental depression, impairment of sexual desire and of sexual power, etc.

This disturbance lasts from ten months to four years, and the prognosis is good. Certain mental diseases must be excluded in making the diagnosis, such as paresis, presenile dementia, maniacal depressive insanity, alcoholism, arteriosclerosis, neurasthenia. Mendel uses the terms *climacterium virile* and *molimina climacterica viri* to describe this male menopause.

The danger in recognizing such a condition lies in the liability to regard all symptoms occurring at the period of life mentioned as indicative of the menopause. Neurasthenia is not uncommon at this age, and there are causes which may be especially active at this period, such as failure in business, increased cares following years of struggle, etc. Whether the symptoms mentioned are attributable to diminished activity of the sexual glands or not is at least disputable.

Intermittent Lameness. Schlesinger¹ has observed over 100 cases of intermittent lameness, and they were frequent in hospitals, where Erb seldom found the disorder. Schlesinger emphasizes the importance of examination of the femoral artery, as in his experience a vascular bruit or thrill to be heard or felt is not rare in this artery. When this condition is present, atheroma of the arteries in the extremities may be diagnosticated. He detected alteration of the femoral artery that could be felt or heard in 17 out of 57 cases. Atrophy of the muscles of the leg was seen in 2 cases, and it was on the side of the diseased arteries. It appeared to be of vascular origin. Remissions may last many years. In 4 cases the symptoms were in the upper limbs, and these persons so affected were not Jews. Schlesinger, like Erb, attributes a causal relation to the abuse of tobacco; more than 90 per cent. of his patients smoked, and 62 per cent. smoked excessively. Disappearance of the symptoms after cessation of smoking occurred repeatedly, and recurrence of symptoms was frequent after smoking was renewed. Syphilis also is an important cause. In 3 cases, rapid and remarkable disappearance of the symptoms occurred after antisyphilitic treatment. Nine of Schlesinger's patients had diabetes, which is not extraordinary, inasmuch as 42 out of the 57 were Jews. Intermittent lameness, he concludes, is a symptom of disease of the arteries of the extremities.

Erb has described a form of intermittent lameness developing rapidly. The type is rare and not well known by the German physicians, or even

¹ *Neurologisches Centralblatt*, January 2, 1911, p. 6.

the Russian, who see many cases of intermittent lameness. Erb has reported 2 cases with acute onset, and now Higier¹ publishes in detail a case he presented briefly in 1907. In the latter's case, the patient was aged only twenty-five years, no etiological factors were determined, a family and racial (Jewish) tendency was present, the disorder developed within a few days, pain was felt in the affected foot when it was at rest, the foot was hypersensitive, congested, and ulcerated, the pulse of the dorsalis pedis and tibialis posticus arteries was lost, and the symptoms diminished very gradually by application of the anode galvanization.

The symptom complex is the same in all the three cases to which reference has been made. The patients were men in the twenties, not having arteriosclerosis, in whom the appearance of arterial inflammation developed rapidly in one foot, with loss of the pulse in the foot and with intermittent lameness. Fever, general symptoms, local inflammatory changes in the leg, or preceding infectious diseases did not occur. Higier believes Erb is right in making this type distinct from the other forms of intermittent lameness. It resembles erythromelalgia, but, in the latter, the symmetry, deep redness, swelling, local hyperidrosis, and strong pulsation are in contrast to the unilaterality, loss of pulse, and later ulceration of the former.

Cases must be distinguished in which sudden severe pain and greater impairment of gait result from venous thrombosis occurring with old obliterating arteritis.

Paralysis Agitans. Paralysis agitans has been almost universally accepted as a disease of middle or late life. Willige² has reviewed the cases in which it was supposed to have developed early, and in a long and important paper comes to the conclusion that most of the cases of so-called early paralysis agitans will not bear examination, some are certainly not examples of this disease, and some are doubtful, but there are sufficient reliable cases to warrant the statement that paralysis agitans may occur in early life. The number of reliable cases is about 12 (possibly 14). The earliest case developed at the twentieth year, possibly the eighteenth year. The symptoms of the disease are the same whether it develops early or late in life, but when it occurs early it is more likely to be confused with multiple sclerosis. Trauma or overexertion is of little importance in juvenile paralysis agitans, but infectious diseases, especially typhoid, have more importance. In about half of the cases a family tendency to the disease has been observed, and this is much greater than in the presenile cases. Willige, therefore, believes these family forms should be regarded as a distinct group under the name of paralysis agitans juvenilis familiaris.

Myasthenia Gravis. This disease is so little understood that a typical case with microscopic study, such as that recorded by Bruce and Pirie,³

¹ Neurologisches Centralblatt, September 1, 1910, p. 911.

² Zeitschrift für die gesamte Neurologie und Psychiatrie, vol. iv, No. 4, p. 520.

³ Review of Neurology and Psychiatry, September, 1910, p. 537.

is a valuable contribution. In the words of these authors: The case was remarkable in the absence of any definite "lymphorrhages," such as have been found in many cases of myasthenia. There was here and there in the ocular muscles a slight increase of lymphocytes, but neither in them nor in any other organ was there any accumulation deserving the name of lymphorrhage. The muscles were not normal, having lost their polygonal outline and become circular, and presenting a certain increase of the sarcolemma nuclei and some degree of vacuolation.

The pituitary body showed a remarkable degree of congestion of the capillaries of its anterior lobe, and this was not a development merely of the last hours of life. There was no definite evidence of any hyperactivity of the cells of the gland. The authors believe that disturbances of circulation in this gland may be responsible for some of the symptoms of the disease.

The most striking of the postmortem appearances, they state, was the remarkable dilatation of the vessels of the pons and medulla oblongata, especially those immediately ventral to the floor of the fourth ventricle, and the edematous condition of the nervous tissue. The relationship of these dilated vessels to the nuclei of the vagus and of the hypoglossal nerves suggests the possibility that temporary alterations in the circulation may have had some influence in producing the sudden accidents in the course of the disease in this case.

Muscular Dystrophy. A very striking form of this disorder is described by H. Steinert.¹ A man, aged twenty-nine years, showed the first signs of disease at the age of twenty-one years. During these eight years peculiar contractions in certain muscles had developed, and the contractions began before any other signs of the dystrophy. The tendons became shorter, causing interference with movement and stiffness. The muscles affected were those usually implicated in progressive muscular dystrophy. Relatives on the mother's side had had a similar disease, with muscular shortening commencing about at the same age. The patient Steinert studied had contraction of the calf muscles, so that he stood on his toes; and of the biceps muscles, so that the forearms could not be fully extended on the arms. His death was from tuberculosis, which has been observed frequently by Steinert in association with muscular dystrophy.

Graves' Disease. The paper by W. Hale White² shows that the prognosis of Graves' disease is less serious than most physicians are inclined to think. He has ascertained what became of 40 patients who were in the hospital from 1888 to 1907, and of 47 private patients seen between 1894 and 1909, who were not operated upon and who did not die. Out of 87 patients, 61 had done well, 21 had done moderately well, and only 5 had not done well. He thinks his cases show that if we follow the

¹ Mitteilungen aus den Grenzgebieten der Medizin und Chirurgie, 1910, p. 105.

² Lancet, December 3, 1910, p. 1599.

after-histories of cases of exophthalmic goitre it will be found that the great majority do well. The private cases did better than the hospital cases, and the mortality was higher in the latter. His figures show that more severe and very severe cases got well in private than in hospital practice, probably because the private patients were better able to rest.

Death occurred in 4 out of 11 cases in which operation on the thyroid gland was done, and this proportion of deaths is about the same as that given by Dr. H. W. G. Mackenzie for similar operations at St. Thomas' Hospital. If the patients are not operated upon, there is no immediate danger in the great majority of cases, recovery frequently occurs, and deaths among those with exophthalmic goitre are not much more numerous than among healthy females. Some surgeons who have performed many operations on the thyroid gland have reduced the mortality below the figures given, but the cases selected for operation are chosen mostly from the mild form of the disease, and yet death as an immediate result of the operation occurs in a few. It is therefore not likely that operation lessens the mortality of Graves' disease, but possibly it hastens the cure, and, if this be true, the justification for performing operation will be greater among wage-earners than among others.

Most important in treatment is absolute rest in bed for many weeks. During the daytime the bed should, whenever possible, be out of doors, and if the weather permits, the patient may be out of doors at night; at any rate, she should sleep with the windows wide open. If after the patient has rested in one place for a few weeks she be moved to some other location, as from the inland to the seashore, recovery seems to be hastened. When she begins to get up she must do so very gradually and must be very careful of undue exertion.

Next to rest, the most important feature of the treatment is food. The patient must not be worried. Moebius' antithyroid serum given in milk, 5-minim doses to begin with, but rapidly increased to 30 minims three times daily, has seemed to be of benefit, but some patients do just as well without it. Hyoscine is the best drug for the excitement in extreme cases, paraldehyde is very useful in less severe cases, and bromides in still less severe cases. Digitalis may be given for the tachycardia.

CRANIAL NERVE PALSY IN GRAVES' DISEASE. Paralysis of cranial nerves is rare in Graves' disease. A case of this disease with paralysis of several of the cranial nerves has been reported recently by Max Kappis.¹ The Graves' disease was pronounced, but not intense; it began in early youth, and gradually paralysis of the ocular muscles and of the facial and vagus nerves developed, although in the latter nerves it was transitory. The ocular palsies persisted, and were attributed to toxic products of the thyroid gland. The patient had very slight movements of the eyeballs in any direction, and often all movements were impossible. The

¹ Mittheilungen aus den Grenzgebieten der Medizin und Chirurgie, vol. xxii, No. 4, p. 657.

inner eye muscles were not paralyzed. Kappis states that in 25 cases observed within the last two years he has found a case with paralysis of the left soft palate, one with disturbance of deglutition, and one with moderate ocular palsy. He refers to similar cases reported in the literature, and states that paralysis of all the motor cranial nerves, except of the accessorius, has been observed. The ocular muscles have been most frequently affected, and more than 40 cases with this form of paralysis are to be found in the literature. Kappis has found the records of 9 cases of Graves' disease in which death occurred with bulbar symptoms. They were all cases of severe Graves' disease and had a duration of a few days or a few months. The paralysis lasted usually only a number of days; in a few cases it lasted weeks or a few months. The limbs were occasionally partly paralyzed.

In some cases almost complete paralysis of the bulbar nerves, with chronic course, has occurred, in which the vital centres in the medulla oblongata escaped for a long time or were not affected at all. The paralyses usually develop after the Graves' disease has been present a long time and in much severity; they usually develop slowly, but sometimes have an acute onset, and then the symptoms of Graves' disease may increase rapidly. Cases are known in which Graves' disease developed acutely and paralysis soon appeared, others in which the Graves' disease and the paralysis developed simultaneously, and still others in which paralysis appeared first and other symptoms of Graves' disease developed later. The paralysis has usually been persistent, but complete recovery has occurred in some instances. Death seems to have been caused by the severity of the Graves' disease or by vagus paralysis.

As regards prognosis, it may be said that, in acutely developing and extensive paralysis, bulbar palsy may be very grave, whereas in slowly developing paralysis danger to life is great when the vital centres become affected.

Kappis attributes these palsies to lesions in the nuclei of the cranial nerves, but the pathological findings leave much to be desired. Small hemorrhages are probably agonal, and have no clinical significance. The possibility of cranial nerve palsy is an argument employed by Kappis for urging the partial removal of the thyroid gland. Some palsies of Graves' disease may be symptoms of myasthenia gravis.

SURGICAL TREATMENT OF GRAVES' DISEASE. The removal of half of the thyroid gland in the treatment of Graves' disease is recommended by Leischner and Marburg¹ when there are symptoms of compression from the gland or when the patient is incapacitated for work and work is a necessity, also where the symptoms are unendurable or the cachexia is of high grade, provided medicinal means have been tried previously. Extreme cachexia or cardiac degenerations are contraindications.

¹ Mitteilungen aus den Grenzgebieten der Medizin und Chirurgie, 1910, vol. xx.

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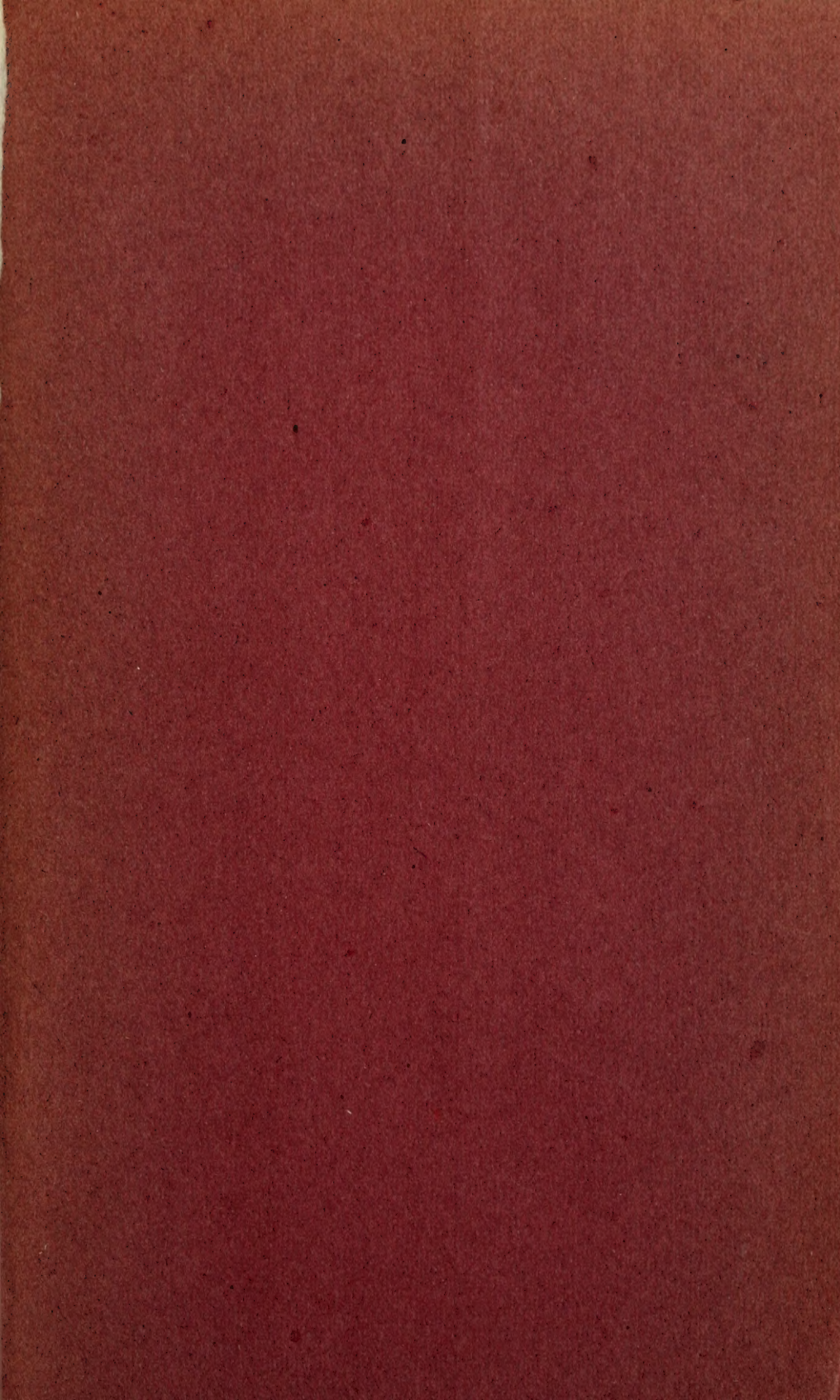
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